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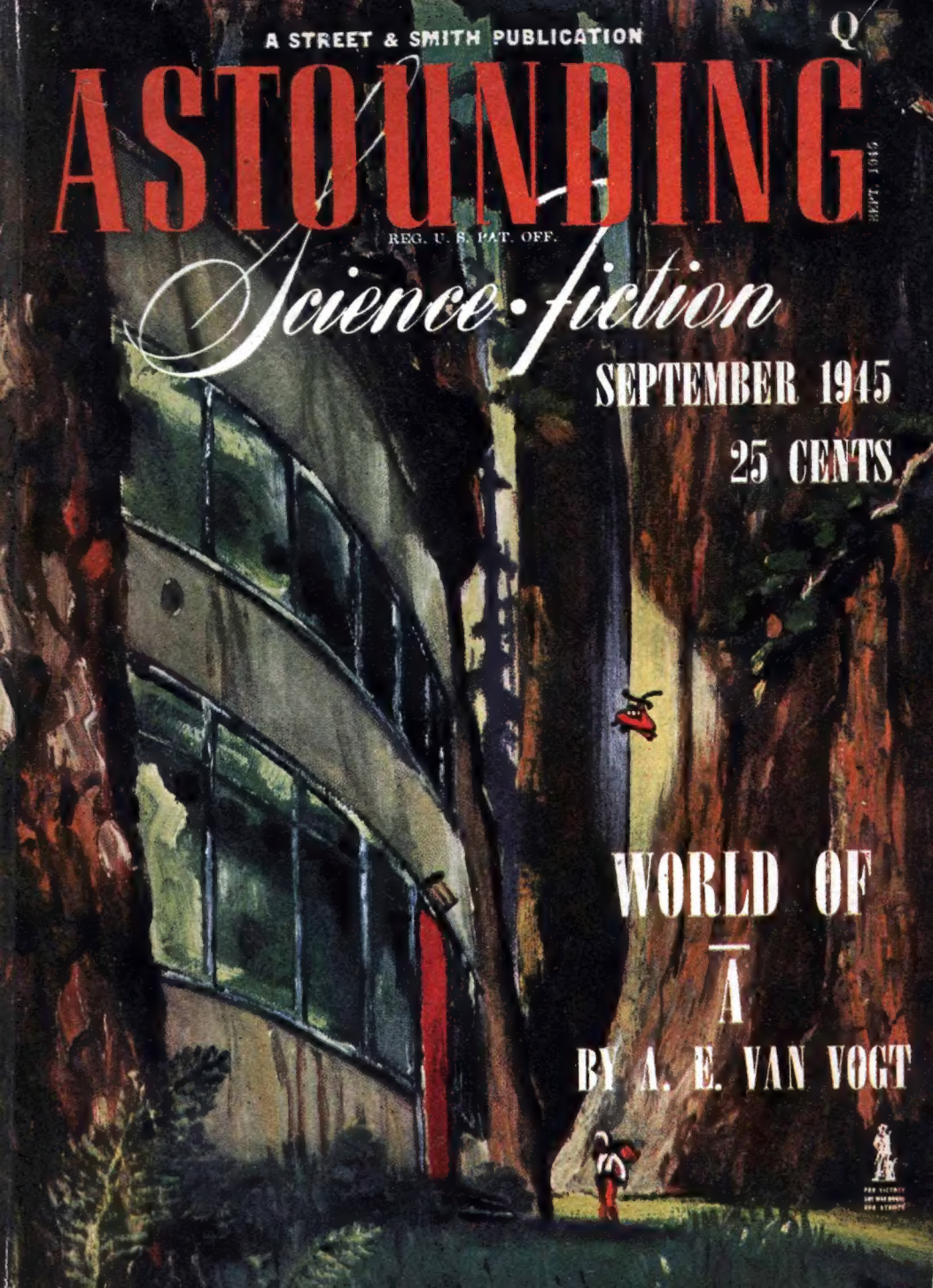
ASTOUNDING

REG. U. S. PAT. OFF.

Science-fiction

SEPTEMBER 1945

25 CENTS



WORLD OF
A

BY A. E. VAN VOGT

The "Bottle Bacillus"
Pityrosporum ovale

It may be Infectious Dandruff ...better do something about it NOW!

IF YOU have persistent symptoms like those mentioned above don't ignore them. You may be running into a peck of trouble. They can mean you are in for a case of infectious dandruff.

Don't waste a minute hoping that it will disappear. Get started at once with Listerine Antiseptic and massage. Your common sense tells you that germ-killing action is important when germs are present, and that early and persistent treatment may head off infection before it can become really troublesome.

Kills "Bottle Bacillus"

Listerine Antiseptic gives scalp and hair an antiseptic bath. It quickly destroys millions of germs, including the stubborn "bottle bacillus," held by many dermatologists to be a causative agent of the infectious type of dandruff.

Often, from the very outset, you can note improvement. Scales and flakes begin to disappear. Irritation is relieved. Your scalp glows and tingles. It looks healthier and feels healthier.

76% Improved in Tests

In clinical tests, Listerine Antiseptic, used twice daily with massage, brought marked improvement within a month to 76% of the dandruff sufferers.

Literally thousands of men and women rely on Listerine Antiseptic and massage as a precaution against infectious dandruff, and as a prompt first-aid treatment when infection has started. Listerine is the same antiseptic that has been famous for more than 60 years in the field of oral hygiene.

LAMBERT PHARMACAL CO., *St. Louis, Mo.*

LISTERINE ANTISEPTIC
and Massage

POINTED RHYMES FOR TRYING TIMES

By Berton Braley

Here is wisdom by the peck
Versified to save your neck!

DON'T BLOW IT

Oh, workman or scholar,
Hang on to your dollar
And do not spend it soon,
For every cent
Unwisely spent
Inflates the price balloon.

Bonds you buy with payroll earnings,
Help fulfill your future yearnings.

Money in your pocket,
Take it out and sock it
Into War Bonds, which
Help to make you rich.

WHO? ME?

There was a little dope with a fat
pay envelope
And she spent every cent that
was in it.
And she wondered, by-and-by,
why the prices rose so high,
But she didn't blame herself for
a minute.

INFLATIONARY MARY

Inflationary Mary spills
This silly kind of chatter:
"My little teeny-wee bills
And spendings do not matter.

"And if I cheat a little bit
On rationing and ceilings
The Nation's welfare isn't hit
By my small lawless dealings!"

Inflationary Mary's wrong,
For she'd be much to blame
If people in a mighty throng
Should say and do the same.

Small spendings, in the aggregate,
Reach sums extraordinary,
So let's not try to imitate
Inflationary Mary.

ADVERTISERS, PUBLISHERS—NOTE:

You are welcome to use all or any part of the material on this page to aid the fight against inflation.

SNAKE IN THE GAS

There was a crooked man and he
lived in crooked style,
He dealt at crooked markets with a
smugly crooked smile.
He viewed himself as clever with
his crooked ration book,
But everybody knew him for a
crooked little crook.

THE GANG'S ALL HERE

You may ask, "Why should *my* spending
Cause inflationary trending
Though I squander every penny I have got?"
—If you're joined by sixty millions
Of civilians blowing billions,
You'll discover that it matters quite a lot!

ONE PERSON CAN START IT!

You give inflation a boost

—when you buy anything you can do without
—when you buy above ceiling or without giving up stamps (Black Market!)
—when you ask more money for your services or the goods you sell.

SAVE YOUR MONEY. Buy and hold all the War Bonds you can afford—to pay for the war and protect your own future. Keep up your insurance.

A United States War message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

ASTOUNDING
SCIENCE FICTION

Reg. U. S. Pat. Off.

CONTENTS

SEPTEMBER, 1945 VOL. XXXVI, NO. 1

SERIAL

WORLD OF Ā, *by A. E. van Vogt* 7
Three Parts—Part Two

NOVELETTE

CAMOUFLAGE, *by Lewis Padgett* 135

SHORT STORIES

UNCOMMON SENSE, *by Hal Clement* 47
THE INFIDELS, *by Ross Rocklynne* 63
THE POWER, *by Murray Leinster* 83
DEADLY HOST, *by Raymond F. Jones* 115

ARTICLE

THE ELUSIVE MICROVOLT, *by George O. Smith* 101

READERS' DEPARTMENTS

THE EDITOR'S PAGE 5
IN TIMES TO COME 165

COVER BY TIMMINS

Illustrations by Kramer, Orban and Williams

Editor
JOHN W. CAMPBELL, JR.

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$2.50 per Year in U. S. A. Printed in [redacted] the U. S. A. 25c per Copy

NEXT ISSUE ON SALE SEPTEMBER 18, 1945

Microclock

So long as Man was a nomad creature, the finest time divisions of any real importance to him were the seasons. Even when agriculture was established, seasonal time division was quite good enough. As government grew more complex, smaller divisions—months, weeks and days—became more important. But the idea of dividing days into parts was comparatively recent, and the gadgets for doing it were still more recent. The sundial was almost certainly the earliest—direct descendent of the shadow of some handy tree—and the water clock followed as the first device capable of measuring hours day *and night* —and at all seasons.

Hours, minutes, finally seconds were measured by more and more refined mechanical devices. But since the mechanical devices were all started and stopped by human observers, the closest possible divisions were on the order of one fifth of a second.

But that did very well for almost everything man was interested in, up to the latter part of the last century. From that time on, time demands became rapidly more and more acute; not seconds, nor tenths, but fractional microseconds became vital. How many millionths of a second does the impulse load of a lightning flash burden a power line after it strikes? How many thousandths of a second does it take a high-speed overload relay to kick the line out of action when a short circuit develops? How long does it take a nerve impulse to travel from the tip of the finger to the elbow when a pin sticks the finger?

In Babylon they had clocks that measured the hours by the time it took water, dripping at a constant rate, to fill a certain size container. Or how long it took water, dripping from a filled container, to empty it.

In the United States of America, we measure microseconds by the time it takes electrons, dripping at a constant rate, to fill—or empty—a container (read "condenser") of a certain size. The water drip was accomplished by using a small hole, that offered high resistance to the passage of water molecules, to feed the water into the measuring container. The electron drip is accomplished by using a very poor conductor, that offers high resistance to the passage of electrons, to feed electrons into the condenser.

The water clock can time full hours fairly accurately—or full units. But it has one difficulty in timing fractional units; when the reservoir is full, the water pressure is greater, and the drip is faster. When the reservoir empties, the drip slows down. The electronic time-device has the same trouble; when the condenser is nearly fully charged, its back-pressure reduces the available potential to force electrons through the resistor. Ideally, the charge should progress so that the voltage across the condenser increases lineally with time; practi-

cally, it tends to increase on an exponential curve.

The Babylonians used to employ a slave-boy to empty the water-clock's container when, at the end of the hour, it filled. The electronic clock employs a gas-discharge tube to perform the same function. A gas discharge tube can be an ordinary neon bulb; a gas is an almost perfect insulator—until ionization starts. Once that sets in, even a few ions, attracted by the cathode while their lost electrons head for the anode, accelerate to very high, very violent speeds—and batter electrons from other atoms, producing more ions. These ions in turn start speeding, and getting into traffic accidents. (Curious accidents these are; the fenders knocked off all head at enormous speed in one direction, while the damaged vehicles immediately set off at a still more violent pace for the opposite direction.) The resultant effect is, descriptively, called an "electron avalanche." In a very minute fraction of a second, the nonconducting gas has been converted into an extremely good conductor; the electrons assembled on the condenser are shunted through. That, of course, removes the charge on the condenser; that also removes the plate-voltage of the gas discharge tube. With no more accelerating potential, the traffic accidents stop, and, rather miraculously, the fenders all settle back onto the vehicles, and traffic proceeds normally. Ionization ceases, in other words, and the gas is again an insulator. The slave boy has emptied the container, and replaced it for further accumulation of water.

By judicious choice of operating potentials, a very small fraction of the whole exponential curve of the condenser charge can be used, and this small part is effectively a straight line. The resultant output is known, with excellent reason, as a "saw-tooth wave." A plot of voltage vs. time is a perfect saw-tooth shape.

Its use? Applied to a cathode ray oscilloscope, it can be made to move the electron beam's spot of impact on the fluorescent screen from left to right at a smooth, steady rate—and then snap the spot back again to start over extremely quickly. It's fairly simple then to mark the cathode ray tube so that one inch represents, say 10 microseconds. If something happening at instant A is caused to start the sweep, and the spot moves 3.72 inches to the right before the result of that original happening manifests itself as a sudden upward kick of the flying light-spot, then reaction followed action by 37.2 microseconds. A beam of light, incidentally, could travel 6.9 miles in that time; it could be reflected from a mirror 3.48 miles away. The motion of the cathode ray light spot can be made a perfect scale-speed model of a beam of light. Since light travels 186,000 miles in a second, it's hard to measure light's speed in seconds. But with a clock that measures microseconds accurately—even light travels only about 1000 feet per microsecond.

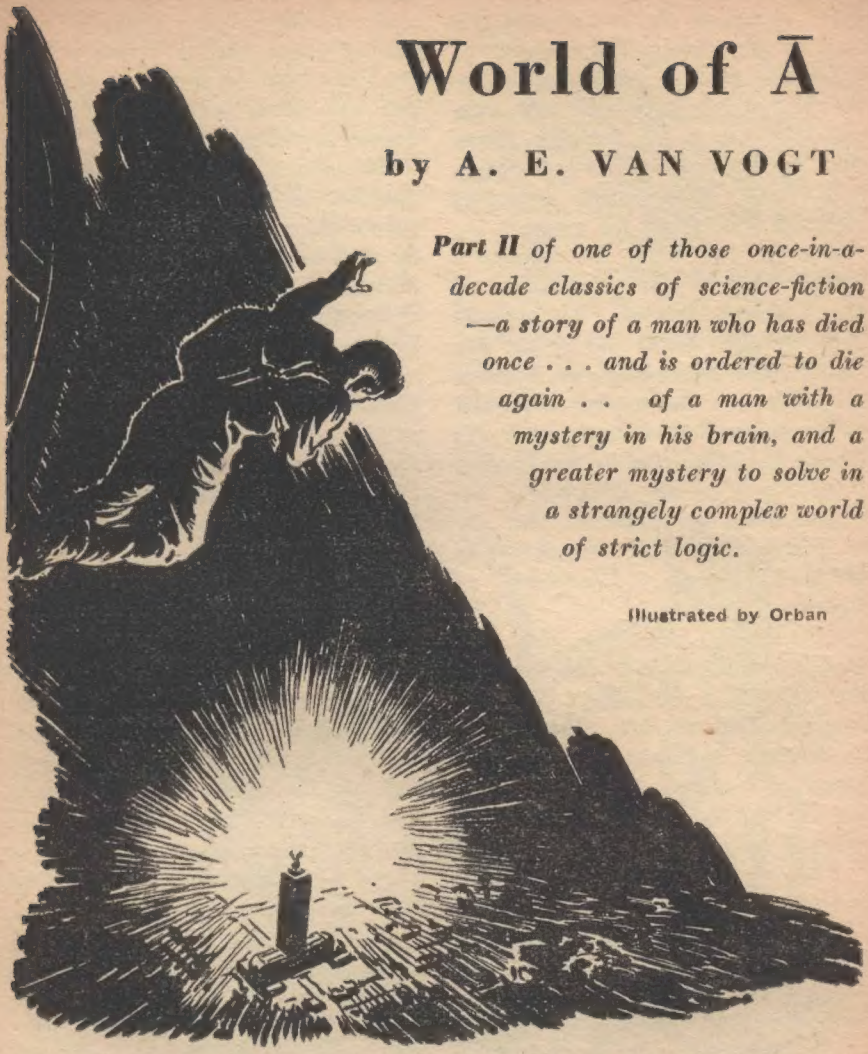
THE EDITOR.

World of Ā

by A. E. VAN VOGT

***Part II** of one of those once-in-a-decade classics of science-fiction —a story of a man who has died once . . . and is ordered to die again . . of a man with a mystery in his brain, and a greater mystery to solve in a strangely complex world of strict logic.*

Illustrated by Orban



Synopsis

By the year 2560 A.D., the semantic philosophy of Ā dominated human existence. Annually, in the games of the Machine, hundreds of thousands of young men and women competed during the policeless month, and tried to become "worthy of Venus". The lesser winners were awarded all the good jobs on Earth. The top winners were sent to glorious Venus, there to become citizens in an all Ā civilization.

Gilbert Gosseyn received his first great shock on the eve of the first day of the games: He was barred from the mutual protective group of the hotel in which he was staying—because a lie detector stated that he was not Gilbert Gosseyn. The hotel management promptly expelled him from his room.

Out in the night he rescues a young woman from marauders of the policeless period. He quickly suspects that she is not as she has stated, a poor working girl, because she flashes a twenty-five thousand dollar bejewelled cigarette case. He begins to realize that he has become involved in some tremendous intrigue when he discovers that she is Patricia Hardie, daughter of Michael Hardie, President of Earth.

The Games Machine also tells him, when he arrives for his first test, that he is not Gilbert Gosseyn. It coolly informs him that he will be allowed to compete under the name of Gosseyn for fifteen days, but by that time he must have discovered who he really is.

That night Gosseyn is kidnaped, and taken to the palace of President Hardie. He is interviewed by Hardie, by a cripple with a strong personality, called "X", and by a sardonic giant, named Thorson.

He learns that the president of Earth is involved in a plot to destroy Ā, and seize control of the Solar System.

The three plotters become very excited when they discover something in a photograph of Gosseyn's brain. And when, after being driven almost insane by torture, he succeeds in escaping from a steel-walled room, he is pursued and mowed down by machine-gun bullets and flame guns. Thus death comes to Gilbert Gosseyn I.

Gosseyn awakens in a mountain hospital on Venus. He has the full memory of having been killed, and he realizes that somehow, someway, his personality has been preserved in another body. It is the only possible explanation.

He swiftly discovers that he is illegally on Venus, and accordingly is subject to death, automatically. He overpowers John and Amelia Prescott, the doctors in charge of the hospital, half convinces them of the existence of the plot to overthrow Ā, and then sets out into the Venusion wilderness to escape the detectives they had previously called to arrest him.

Venus turns out to be fantastic land with trees three thousand feet tall and hundreds of feet in diameter. It abounds with natural fruits and vegetables, and the climate is perpetually, marvelously mild. It is a land of dreams, the heaven of the Solar System.

On the sixteenth day, a roboplane agent of the Games Machine rescues him, informs him that there is no chance of his escaping capture, and advises him to surrender to the pursuing detectives with a carefully prepared story. It tells him that fully half the detectives on Venus are agents of the gang, and that it is taking him to the forest home of one of these detectives.

At the last minute, as he is get-

ting out of the plane, it explains that there is a factor in the affair of which it knows nothing, an alien factor. But that whatever evidence is available, he will find it here.

Gosseyn finds the tree house furnished but unoccupied. He discovers a curious tunnel at the back of the apartment. The tunnel leads into the depths of the tree, and, after some strange dreams about beings and ships that have come from remote interstellar space, he decides reluctantly to explore the tunnel.

IX.

"The human nervous system is structurally of inconceivable complexity. It is estimated that there are in the human brain about twelve thousand millions of nerve cells or neurons, and more than half of these are in the cerebral cortex. Were we to consider a million cortical nerve cells connected with one another in groups of only two neurons each, and compute the possible combinations, we would find the number of possible interneuronic connection-patterns to be represented by ten to the power of two million seven hundred eighty-three thousand. For comparison . . . probably the whole sidereal universe does not contain more than ten to the power of sixty-six atoms."

A. K.

He was one man alone. That was what disturbed Gosseyn as he moved along the hard wooden floor. From every sensible viewpoint, he ought not to be risking himself in this unknown venture.

Because, literally, he was *the* man in the whole affair. The man who knew from personal experience that something was going on. Only the Machine, of the forces not hostile to him, knew more.

And yet that very Machine had sent him to this forest. Brought up, as he had been—as he must have been somewhere, no matter where his memory derived from—to regard the Machine as a gateway to paradise, not even the critical attitude of the Venusians towards it could change his basic convictions that its purposes were honest.

The Machine desired his success; it craved the information he might secure. It was for him.

And he *had* to be for it. Clearer and clearer, the fact was emerging that only through it could he learn whatever truth about himself there was to learn. "X", Hardie, the others, could tell him something, but the Machine must know more than they did.

Nevertheless, no amount of information would be any good to a dead man.

Gosseyn thought savagely: "I'm being rushed along too fast. If I ever get out of this, I'll make no further move without first finding out things about myself."

He couldn't expect to come back to life a second time.

There was a drabness about his surroundings that permitted thought. The tunnel had become winding, and there was a distinct

downward tilt to the floor. The curving walls gleamed dully in the light of the flash.

Twice, during the first ten minutes, the tunnel divided in two, one corridor veering off sharply to the left, the other more evenly to the right. Gosseyn kept to the right, mainly because that seemed the straighter route of the two.

During the next fifty minutes, seven tunnels joined the corridor he was in; and three times more, the corridor split ahead of him. It could have been confusing, but Gosseyn followed a very simple plan.

He had a notebook, in which he drew a map, marking off each side tunnel. By the end of the first hour, his initial sense of drabness had yielded to a genuine fascination.

"I must," he thought in wonder, "be walking several hundred feet below the ground, following the intertwining roots. I'm actually under the forest."

More and more astounding grew the fact of this amazing series of passageways cut through the tremendously hard wood of a colossal forest. He had never before thought of the extent of the roots supporting the mighty trees. But here in this continuous maze was evidence that the roots were at once large in size, and pressing in, one upon the other, so tightly that it was impossible to decide from inside the tunnel, where the connections were, where one root left off and another began.

Time dimmed Gosseyn's wonder. His mind turned to a new direction: These side passages! There must be some indication as to where they led. Mazes like this were surely not left unmarked, whether by aliens or human beings.

He examined the next side tunnel. There was nothing visible. The wood, lemon-colored here in the nether roots, curved solidly up to a solid appearing ceiling. As far as his fingers could reach, he fumbled over the metallically hard surface. And there were no switches, no hidden panels, no directions of any kind.

He was disturbed now. The pause, the brief thorough investigation, had brought his first real awareness of the tremendousness of the exploration job he had let himself in for.

These tunnels apparently were endless. He'd need food, if he was really going to investigate them, as he must. Too bad he had to retrace two hours of walking. But better two hours than five. The time to turn back was before he got hungry or thirsty.

He reached Eldred Crang's apartment without incident. He made a pile of sandwiches; and he was sitting down to breakfast, when the four men came in.

They entered through three different doors. The first three men held guns, and they came in as if they had been catapulted by the same tight-wound spring. The fourth man was a wiry chap with coldly gleaming, yellow-green eyes. He had no gun, and he entered in

a more leisurely fashion. It was he who said:

"All right, Gosseyn, put up your hands."

Gosseyn sitting rigidly at the table, head twisted up and around, presumed darkly that Eldred Crang, "X" agent and Venusian detective, had come home at last.

Queerly, Gosseyn's first reaction was relief. He hadn't realized how tensed he was. It was the going alone into the tunnel, he realized. The prospect of being destroyed in some remote dark hole without anyone knowing what he knew. The emotional—as distinct from intellectual—conviction that, regardless of what the Machine had wanted, he was a fool to obey its orders verbatim until he had enlisted human allies.

Until more responsible men with a will to action knew the danger that civilization was in, Gilbert Gosseyn must hold his life in trust.

He tried to think of the coming of these agents of "X" as precipitating movement in the right direction.

He stood up slowly, hands raised, and stood watching them curiously, saturating himself with their presence. He felt undecided as to how best he could tell them the story the Machine had urged upon him.

As he studied them, interested, one of the men walked forward, and broke open the package of sandwiches. They spilled out in a white and brown array, two falling on the floor with a vague sound, like pieces of dry dough.

The man didn't speak immediately. But he smiled as he stared down at the sandwiches. He was a thick-set, nicely groomed individual in his early thirties with a too large mouth.

He moved over to Gosseyn.

"Going to leave us, were you?"

His voice was gentle, cultured. He smiled again. He hit Gosseyn stingingly across the face with the flat of his hand. He repeated in a dead-level tone:

"Leaving, were you?"

He drew his hand back again. From Gosseyn's left, Crang said sharply:

"That's enough, Blayney."

The man lowered his arm obediently. But his face worked, and something of the culture slid from his manner and from his voice:

"Eldred, suppose he'd gone. Suppose we hadn't found him here! We've been searching for more than sixteen days. Why, if he had escaped, the big boss would have—"

"Silence!"

Blayney subsided sullenly; and Gosseyn said coolly to the wiry-bodied leader:

"Crang . . . . I presume you're Crang."

The man who had stopped the second blow nodded slightly. Gosseyn went on calmly:

"If I were you I wouldn't trust Blayney after he gets to be forty."

"Eh?" That was Blayney, an astounded look on his face. Crang's yellow eyes questioned Gosseyn.

"There are psychological explanations for Blayney hitting me as he did," Gosseyn explained. "He's gradually losing his nerve. I'll

wager he was recklessly brave when he was in his teens and early twenties. Now, he gets sadistic, merely thinking of something that might have gone wrong. At forty he'll start having nightmares about the damage he might have suffered in some of the tight spots he was actually in as a youth. And he'll never, never, after forty, risk his own skin in anything dangerous."

Gosseyn shrugged contemptuously. "These things happen all the time to the unintegrated."

Blayney had gray eyes. They glared at Gosseyn, then twisted over to Crang. He said in a hushed voice:

"Can I hit him again, Eldred?"

"No. What do you care what he thinks?"

Blayney looked dissatisfied, and Gosseyn said nothing more to aggravate the situation. It wouldn't do to point out that it wasn't what Gilbert Gosseyn thought, but what he had made the others think.

Besides—his story. These men were acting like uninhibited gangsters. In another minute they'd have gone so far in that direction that they wouldn't be able to reassume their pretended roles of Venusian detectives.

Surprisingly, they listened intently. When Gosseyn had finished, Crang took a cigarette out of a case, and lighted up.

He caught Gosseyn's gaze on him, but he said nothing. There was a slightly baffled look on his face, and after a minute he was still puffing thoughtfully at the cigarette.

Gosseyn had time to study the man.

He was a lean man but not tall, Eldred Crang. There was a dark quality about his appearance, that suggested Middle Eastern or Mediterranean origin. His manner was restless; and that, with his flame-colored eyes, gave a sort of fire to his personality.

Abruptly, his hesitation ended. He laughed.

"Just for a minute," he said, "I had a mind to let you get away with that story. But the truth is, we don't have to play games. We've decided on a plan of action in regard to you, and it's going through. We leave for Earth within the hour."

"Earth!" said Gosseyn.

He smiled a wry smile. They were wasting no time, these agents of "X". Back to "X" they were going to rush him, away from the only planet where his warnings would cause action dangerous to them.

He had been on Venus approximately eighteen days. During that time he had succeeded in half convincing exactly two people that a danger existed. And Dr. John Prescott and his wife had passed his story on to Detective Registry, not knowing that that organization was now little more than an appendage of the gang.

Two people out of two hundred million. Crang was speaking again:

"All right, Blayney," he commanded, "bring the Prescotts in."

Gosseyn started. Then, depressed, waited as John and Amelia

Prescott were herded into the room. They were handcuffed to each other. Prescott said across the room to Gosseyn:

"So they got you, too. This is bad."

Gosseyn mumbled something about being sorry he had pulled them into such a mess. There was a horror in him that made it almost impossible for him to speak. The Prescotts were as good as dead.

It wouldn't be the first time that bystanders had been swept up by a tornado of events. All the ages of Earth were littered with the graves of onlookers. The very elements must be wracked and distorted by the anguish of the multitudinous innocent.

The rest wasn't pleasant either. He pictured Venus swinging its silent, swift course through the starry heavens, its highly civilized inhabitants unprepared for the ravage and defilement that must shortly now strike at them out of the clouded blue of their sky.

The attack *must* be imminent, waiting perhaps only upon a final disposal of the mystery and problem of Gilbert Gosseyn II.

Considering everything, that shouldn't take long.

Through the vast dark rushed a spaceship with one woman and four hundred and two men aboard. It was Crang, on the second day out, who gave Gosseyn the figures.

"We're taking no chances with you," he said frankly a little later, when Gosseyn chided him about the number of guards. "You see, I'm one of the dozen or so men who know who you are."

Gosseyn waited for the titillation to stream along his nerves, the thrill of excitement that had always come in the past when his identity was mentioned. But nothing happened.

He stared at the yellow-eyed detective, feeling drab and lifeless. After a moment he knew what it was. He had become inured. For weeks, he had wondered with pounding heart about the fascinating mystery of himself; and, during those weeks he had exhausted its emotional possibilities as an idea.

He had only the faintest hope that he would again be given the information. He was right.

"But I was told once before," he protested the expected refusal.

"And look what happened; you got away!" Crang said. He laughed grimly. "No, no, Mr. Great Man, we know who you are. We have a pretty good idea why you're being kept unaware of your identity, and we're very sure indeed that the best prison to keep you in, is the prison of your own ignorance. This has been very thoroughly discussed, Gosseyn. In my opinion, Thorson was right in believing that your case parallels that of George the boy who lived with the animals."

Gosseyn said sourly: "What is this plan the gang has in mind for me?"

"You'll learn that," said Crang with finality, "tomorrow night."

After the detective had departed, Gosseyn stood for a long time peering through one of the mammoth

forward portholes out into the night of the plenum. There was a supernally bright star in the darkness ahead. Tomorrow it would take on the contours of Earth. Tomorrow evening he would be inside the official residence of President Hardie. And then what?

Here he was, a very firmly held prisoner. He must assume that, even if they didn't kill him immediately, his only human contacts for days if not weeks, would be gang men. What did that do, for instance to the Machine's unproved suspicion that an alien menace lurked in the tree caves of Venus?

If such a race existed, it must be maturing plans of its own, plans so subtle in their approach to a war against man that only one man and a machine suspected the truth.

No menace that had ever confronted human beings could compare in stealth with this one. The very mystery of it, concealed as it was behind an equally unsuspected revolution of men against men, made it hideous and terrible—if it existed.

Should he assume that "X" was unaware of the aliens? Should he warn "X"?

That was one incident, one line of desperate thought, on a voyage in space that lasted three days and two nights.

The landing was a disappointment to Gosseyn. Mists and clouds ringed the continents; and all the way down through the atmosphere of Earth, those clouds hid the land below. And then—final disappointment—a blanket of fog lay over the city of the Machine, covering all that the clouds had missed.

He had a tantalizing glimpse of the atomic light that was the Games Machine's own dazzling beacon. And then the spaceship sank down into the cavernous interior of a gigantic building.

Gosseyn was whisked off into the gathering fog-ridden twilight. The street lamps came on, and were mist-blurred blobs of light. The courtyard of the presidential palace was deserted, but it came alive with the sounds of the men who poured out of the escort cars, and surrounded him.

He was herded into a long, brightly lighted corridor, and up a flight of broad steps into a great, luxurious hallway. Crang led the way to a door at the far end.

"Here we are," he said. "This will be your apartment while you remain a guest of the president. The rest of you remain outside, please."

He had opened a door into a forty by twenty—at least—living room. As they entered, Gosseyn caught a glimpse of a tastefully furnished bedroom through a half open door; and there was another door—through which a man came. The fellow bowed low, and said respectfully:

"I've laid out your evening clothes on the bed, sir. Dinner will be served in the main dining room in three quarters of an hour. May I help you dress?"

Gosseyn turned to Crang with a sardonic smile.

"I've heard of executioners of old times wearing dress suits," he said, "but this is the first time, so far as I know, that a victim has been asked to get into one."

Crang grinned. It was an engaging grimace, and quite friendly. But it ended in a frown.

"Mr. Gosseyn," he said finally, soberly, "we're a pretty tough bunch. We've had to be. Most of us spent our first thirty years learning that there was no place for us in a world where everybody has to be integrated in order to so much as get a good job."

His face worked, and there was no grin even near it. He swallowed hard, as if he was remembering or experiencing a bitter taste. He said thickly:

"How I slaved to integrate myself. I spent years almost sweating blood over my studies, and physical exercises; and yet all the time I knew it was wrong. I knew the human body and mind as a whole shouldn't be forced to meet such a rigid set of qualifications.

"Maybe that doubt prevented me from ever becoming properly integrated, according to the standards of the Machine."

He broke off; he smiled wanly; he went on:

"According to those standards, all of us in the organization are unsane. We must be, or we would have been able to win at the games without cheating. Unfortunately, or rather I would say fortunately for the future of man, we, the leaders anyway, are also intelligent. We have no intention of spending our four score and ten neatly pigeon-holed, doing minor administrative or minor clerical work."

His eyes grew stormy again, and there was fire in his voice, as he snapped:

"It is better to be dead than to be nonentities. Death at least is not a constant frustration."

He stopped, and seemed to become really conscious for the first time that he was being emotional. His face cleared. Calm and cool, he said:

"As you know, our determination to overcome the rigidity of the Machine has paid off well. Today, the Solar System is ours for the taking —except for one man.

"That man is you." He stared at Gosseyn somberly.

Gosseyn said: "You have me in your power. Why don't you kill me?"

"We tried that once, and it didn't work." The yellow eyes were glowing. "Do you think you would still be alive if you were killable?" His voice grew hushed. "Gosseyn, you can't imagine the shock we felt when we heard the Prescotts say you claimed you were the same personality, the same mind, the same memory, in another body. It was like a blast of lightning into all our plans, and we've been afraid to move until we found out more about you."

Gosseyn almost said: "I thought you people weren't afraid of anything." He didn't say it because he knew the kind of fear that Crang meant.

Instead of speaking, he let him-

self sink into a mental half-darkness; and from those shadows he peered forth, allowing impressions to come into him. Thoughts came: These revolutionaries who could kill him any second—retreating to discussion. He did not share their belief in his immortality. So that, actually, all that stood between him and a bullet was the tenuous threads of their thoughts about him.

He saw that Crang was eying him. "Tell me," said the detective, "what did you think of that little harangue?"

Gosseyn was cautious. "It might not be a bad idea if a competent board reviewed the examinations every twenty-five years. But there is nothing basically wrong with examinations. Entrance standards are as old as civilization."

Crang was turning away. He paused. "Do you think you can be ready in half an hour? I want to show you something before dinner."

"I'll be ready," said Gosseyn.

Not Crang but half a dozen guards led Gosseyn down several flights of stairs, and along a narrow corridor to where a man in a dress suit was waiting beside a door. Several seconds passed before Gosseyn recognized the slim young dandy as Eldred Crang.

Crang nodded, then opened the door. Through it, Gosseyn had a glimpse of a marble floor and of machines.

"You're to go in alone, Gosseyn, and look at the body."

"Body!" said Gosseyn curiously. Then he got it. *Body!*

He forgot Crang, forgot the guards. He went in. The larger view of the room disclosed more machines, some tables, wall cabinets lined with bottles and beakers and, in one corner, a longish shape lying on a table, and covered by a white sheet.

Gosseyn stared at the sheeted figure, and a considerable portion of his remaining calm began to slip from him. These many days he had talked of this other body of his; and, while the verbal picture he had conjured so often, had affected him, there was a difference.

It was the difference between a thought and an event, between words and reality, between death and life. So mighty was that difference that his organs experienced a profound metabolistic change; and his nerves, unable to integrate the new reactions, began to register wildly.

His bones seemed literally to shake inside him; and then he felt eerily fleshless, like a skeleton rattling in the wind. From that it was only a moment until he had no feeling at all.

Feeling and a return of bodily sanity came back with a rush. He grew aware of the floor pressing against his feet, and of the air of the room, cool and dry as ashes in his lungs and in his mouth. His vision blurred. Slowly, conscious again of his humanness, but still unnormal, he let his mind float out towards that still, dead form. And though he had no consciousness of any movement, he must have walked towards the body, he must have

reached forward, and, with the tips of his fingers, lifted the sheet, and dragged it off the body on to the floor.

He stood there. He had expected to see a hopelessly charred body. In some respects, the corpse that sprawled rigidly on its back on the marble table was horribly damaged, but it was the body proper not the face that had suffered.

They must have had orders, the men who fired at him, orders not to injure the brain. The body had been ripped almost in two by machine-gun bullets. The chest and waist were little more than tattered flesh and bone, and every ragged strip, every square inch of skin above the knees was burnt so terribly that there was no human resemblance.

The face was intact.

It was a serene coutenance, untouched by the fear and insanity and unendurable anguish that had wracked it in those hours before death struck. There was even a touch of color in the cheeks; and, if it hadn't been for the blasted body, it might have been a young man sleeping there, so lifelike was the face.

Undoubtedly precautions had been taken to prevent the brain from rotting. After a moment, he noticed that the top of the head was not actually attached to the skull. It was there, but it had been neatly sawn off, and temporarily replaced.

Whether the brain was still inside or not, Gosseyn made no effort to find out. But a thought came in connection with it, an intent, reaching thought that alarmed him; the thought:

They must have discovered things. They must now know more than they had known. Suddenly, it seemed to him, he understood why he had been brought across interplanetary space to this rendezvous with his own dead body.

These people knew who he was, and now they had discovered what it was in his brain that the lie detector in the hotel and, later, the Games Machine had urged him, one by implication, the other directly, to investigate. Tests would be made, based on new facts.

A sound behind him made Gosseyn straighten slowly. He did not turn immediately, but his mind began to lift clear of the body, and to recognize in greater detail his general situation. It took several seconds before he identified the sound with a memory of other similiar sounds: Rubber wheels on marble. "X".

He looked around at last with the cold determination of a man who has braced himself for anything. With icy gaze, he stared at the plastic monstrosity of a human being. Curiously, "X" was slightly different than he remembered. That held Gosseyn for a moment, but after several seconds he still couldn't define the difference.

He turned his attention to the other people who had followed "X" into the laboratory. Bleakly, he looked straight into the eyes of the superbly handsome Hardie. His gaze passed by to meet the cynical

eyes of the giant, Thorson; and, finally, to where, half hidden behind the two men, Particia Hardie, cool and interested, watched him with bright eyes.

"Well!" It was "X", bass-voiced. And that, too, was slightly different. The voice seemed not quite the same, as he remembered it with the transplanted memory of Gilbert Gosseyn I. He forgot that, as "X" went on, without humor:

"I have an idea, Gosseyn, that you haven't the faintest plan for stopping us from laying you out cold beside your other body."

It was not a brilliant analysis by any means, but it had one very important quality about it from the viewpoint of a man who had no belief at all that the essence of his personality would recur in a third body, if this second one was destroyed.

The important quality was that, word for word, it was the truth.

"X" was waving his plastic arm with a gesture that suggested impatience. His next words confirmed it.

"Enough of this tomfoolery. Bring in the Prescott woman, and hold Gosseyn."

Four men held Gosseyn, as the woman was brought in by three

huge guards. They looked as if they had been in a fight. Amelia Prescott's hair was down and her face flushed. Her hands were tied behind her back; and she was breathing heavily. There must have been a transparent plastic gag in her mouth because her lips worked frantically when she saw Gosseyn. Futile effort. She subsided finally, shrugging. She smiled at him a little sadly, but there was a grand pride in her manner too.

"X" faced Gosseyn, peering at him from under the dome that covered his head. He said:

"Gosseyn, you've put us into a dilemma. We're geared for action on a scale not seen since the fourth world war. We have nine thousand spaceships . . . forty million men . . . gigantic munitions factories. Gosseyn, *we can't lose.*"

He paused, then went on: "Nevertheless, we prefer to play safe. We'd like to invite you, the unknown quantity, to join us as one of the top leaders."

He shrugged. "But you can understand that it would be useless even to begin such a relationship if you turned out to be unwilling to accept the realities of our position.

"We *have* to kill, Gosseyn. Every revolution that has not killed has been a failure."

For a moment, Gosseyn thought he meant, kill Amelia Prescott. A faintness seized him. And then, he realized he was being stupid.

"Kill!" he said blankly. "Kill whom?"

"About twenty million Venusians," answered "X."

Sitting there in his wheel chair, he looked like a plastic nightmare of a human beetle.

"As you must know," he said, "the only difference between extinguishing the life from twenty human nervous systems and twenty million is the effect on the emotions of the survivors. Good propaganda should take care of that."

Gosseyn had the distinct impression that he was standing at the bottom of a well, and sinking, sinking.

"And what," he heard his voice come hollowly out of the depths, "about the other hundred and eighty million inhabitants of Venus?"

"Terror!" said "X" in his G-string bass voice. "Merciless terror against those who resist. History teaches that it has never been difficult to control the mass of a nation once its head has been cut off. The head of Venus is a very collective one, hence the large number of necessary executions."

He waved his plastic arm with an impatient gesture. "All right, Gosseyn," he said curtly. "Make up your mind. We'll let you do a lot of the reorganizing, but you must let us create the environment for it. Well, do we make a deal?"

The question startled Gosseyn. He hadn't realized he was being given an argument, which was supposed to persuade him.

It was a case of levels of abstraction in the best null-A sense. These people were inured to the idea of mass executions. He wasn't. The gap was unbridgeable because each

side regarded the viewpoint of the other as nightmarishly foolish.

He felt the rigidity of his refusal creep through his nervous system, through his body, until finally there was only utter, complete, ultimate positivity. He said in a quiet yet ringing voice:

"No, Mr. X. No deal. And may all of you burn in an early Christian hell for even thinking such murder."

"Thorson," said "X," steadily, "kill her!"

Gosseyn said blankly: *"What?"*

Then he dragged his four guards half a dozen feet before they held him. When he could see again, he saw that the woman was still smiling. She did not struggle as Thorson jabbed a syringe into her arm just above the elbow, but she fell like a stone.

The giant caught her easily. Somewhere, "X" was saying:

"You see, Gosseyn, we have an advantage over non-Aristotelians. They're disturbed by scruples. We merely want to win. Now, that little incident was designed to—"

He stopped. A surprised look twisted his face. He tumbled slowly forward to the floor. The hard aerogel of his artificial leg, arm and body made a thumping sound on the marble as he sprawled full length on the floor.

Behind him, Hardie, an equally bewildered look on his classic features, slumped to his knees, then sideways to the floor.

The guards were falling, two of them tugging at their guns, then yielding limply to unconsciousness. Thorson lowered the body of Amelia Prescott to the floor, and sank down beside it. Near them, Patricia Hardie drooped down to the floor with a thump. In every part of the room around Gosseyn, his enemies lay looking very dead.

It was all quite meaningless.

X.

"In reality it is the brain as a whole which is the center of association, and the association is the very *raison d'etre* of the nervous system as a whole."

H.P.

The feeling of amazed paralysis slid from Gosseyn. He dived jerkily for the nearest guard, and came up, gun in hand.

He stood then for a moment, holding the gun tensely, watching for movement in any of the bodies. There was none. Everybody lay very still.

Gosseyn began hurriedly to disarm the guards. Whatever the reason for the astounding opportunity that had come to him, there was no time to waste. The job finished, he paused, and once more stared at the strange scene.

There were nine guards. They slumped on the floor, their bodies forming an odd pattern as if, like so many ninepins, they had all been tumbled with one shove. Gosseyn noted, without thinking about it, that Eldred Crang, the Venusian detective and top gang leader, was not among them. His gaze wandered swiftly over the remaining bodies, the two women and the

three men. He thought, almost blankly:

"I'm not grasping this as I ought. I've got to get out of here. Somebody may come."

He didn't budge. There was another, a mighty thought in his mind: Were they really dead?

Almost gasping, he plunged down beside "X". Unthinking, he placed a hand on the plastic cage that supported "X"'s middle. The fleshless smoothness of it made him jerk his hand away in abrupt repulsion. It was hard to think of the fellow as human.

He forced himself to bend near the face. Bend close. And listen! A slow, rhythmic warmth bathed his ear. Gosseyn straightened, rigid. "X" was alive. They must all be alive.

He was about to climb to his feet when a sound at one of the three doors froze him briefly where he was. Then, gun pointed, he flattened himself to the floor. He lay there, eyes slitted, cursing himself for having delayed. He could have been hundreds of feet away by this time. He—

The door opened, and John Prescott came in.

The letdown was terrific. Dizzily, Gosseyn climbed to his feet. He saw after a moment that Prescott was undergoing a relief of his own. But it was amazement that sounded in the Venusian's voice when he spoke:

"Man!" he breathed to Gosseyn. "How did you stay conscious after I put the Drae powder in the air-conditioning machine? You—"

He stopped. "What's wrong?" he said in a queer voice.

It was a fast diagnosis. By sheer accident, Gosseyn's gaze had touched Amelia Prescott's still body where it lay on the floor, near the huge Thorson. And memory had flooded through him. Gosseyn said grimly:

"Prescott, your wife had something injected into her before the others were affected by the powder. It was supposed to kill her. Better examine her."

There was time for examinations, now that the strange unconsciousness of these people had been explained. If the air-conditioning system had spread the anaesthetic agent, then this scene of silent, slumped bodies would be repeated in every room. The danger was that somebody would come in from outside.

Gosseyn watched as the Venusian listened briefly at his wife's heart, then took a little bottle out of his pocket. The bottle stopper had a syringe attached to it. Prescott pressed the needle into her thigh, and looked up.

"That contains fluorescin," he explained, "an early twentieth century discovery. If she's alive, her lips will turn greenish in about a minute."

After two minutes, the woman's lips remained pale and dead. The doctor stood up, and looked around him curiously; and the odd thing, then, was that Gosseyn had no premonition.

He watched the Venusian walk stiffly over to the pile of guns and

ammunition, and carefully select two guns. That was the dominating impression: the care with which the man examined his weapons.

What followed was too swift for interference: Prescott walked over and put a bullet through "X"'s right eye.

Blood spread over the misshapen leader's face like a small, vivid fire. Prescott whirled and, shoving the gun against Hardie's forehead, fired again. He ran down the line of guards, then, body bent low, firing with both guns. He was twisting towards Thorson, when the astounded Gosseyn caught him, and tore the automatics out of his hands.

"You incredible fool!" Gosseyn shouted. "Do you realize what you've done?"

An hour later, when they abandoned their stolen car, deep in the fog-bound city, and the night around them was like a pall of gray-black, they heard the first roaring of the news from an invisible public address speaker:

"PRESIDENT HARDIE ASSASSINATED IN PALACE MASSACRE BY MAN WHO WAS BEING QUESTIONED IN CONNECTION WITH SERIOUS CHARGES AGAINST THE GAMES MACHINE. GILBERT GOSSEYN, THE KILLER, IS TONIGHT, THE TWENTY-SIXTH DAY OF THE GAMES, THE OBJECT OF THE GREATEST MANHUNT OF HISTORY. ESCAPE BELIEVED TO HAVE BEEN AIDED BY VENUSIAN DETECTIVES. STAY AT HOME, EVERYBODY."

It was the mention of the Machine and of Venus that brought to Gosseyn his first, full realization of the implications of that hasty killing. It was the only attack against the sacred symbols of Ā that he had ever heard or seen. Here at short last was the declaration of war. The gang was committed.

Recriminations were, of course, useless. When he finally spoke, it was the tiniest item in the news that he mentioned.

"What gets me," he said, "is the statement that this is the twenty-sixth day of the games. I could have sworn it was only the twenty-second or twenty-third. I've lost three or four days."

Prescott said drably: "Did you notice they didn't mention me? I must have been forgotten in the confusion."

That was the only bright spot, it seemed to Gosseyn, in a cornucopia of appallingly bad news.

He discovered other favorable attributes in their situation: the dark, miasmic night, the fact that they were free, and that "X" was dead. *"X" was dead!* Strange, that he himself hadn't thought of killing the man. But then, of course, he had always believed the solipsist knew so much that would be valuable, if he could ever be questioned. Who, if not "X", would have had the contact with the aliens?

But he was dead now. And somehow the interplanetary revolution no longer seemed quite so menac-

ing. The others would have to go on, of course. A thousand lesser egotists would race to grab control of the gang, with Thorson possibly getting there first. Or Crang! Mustn't forget Crang, the yellow-eyed, who lived in a tree.

Nevertheless, there had been something about "X", a monstrous aura of ability that his successors would have a hard time to match.

It was relieving to have thoughts like that, especially relieving for a man who was standing in a mental, as well as a physical, fog. Gosseyn began to be more aware of the physical fog. It wisped around his face, and it was so thick he could see Prescott, two feet away, only as a shadow.

Ten thousand searching men could lose themselves in this superb and unnatural darkness.

Gosseyn was swept by a sudden exhilaration. "Prescott," he whispered urgently, "let's go. There are things to do. And the night won't last forever."

"Do?" The Venusian sounded surprised, his voice disembodied. "Do what?"

That was no problem at all. For days and weeks, Gosseyn had been under the control of forces that he could only hinder, never oppose. Prisoner in a hospital, the need to escape, the flight, capture—other people, other minds, had composed the tunes to which he danced almost like an automaton. And nobody, anywhere, had ever given him the pause he needed to find out things about, and for, himself.

Now, at last, within limitations, he was free. Free in the sense that he could make plans of his own, and what was overwhelmingly more important, he was no longer out in a wilderness, but in a great city, where people and places existed that could be of use to him. He knew up to a point the extent of his danger, and in his brain was a wealth of information about his opponents and his allies, about the situation as a whole.

In such a fog, on such a night as this, bad luck could destroy him, but nothing else. Certainly not the lack of opportunity. He explained swiftly what he had in mind, finished:

"A psychiatrist—and it can't be anyone I've contacted before—is obviously the first man on my list. There just isn't anything as important as finding out what in my brain has frightened everybody so violently."

"But," protested Prescott, "he'll be under group protection."

Gosseyn smiled tolerantly into the night. He was physically and mentally at ease, conscious of his absolute superiority to his environment.

"Prescott," he said, "I've been in this jam a long time now. For weeks I've been like a bewildered child, timidly following other people's orders—I've told you, for instance, how I allowed the Machine to persuade me to be recaptured."

"Yes."

"I've been trying," Gosseyn continued, to account for my easy acquiescence to such outside advice. And I think now it was because, way in the back of my mind,

there's been a desire to ease out from under all this, and let somebody else take over the whole burden, or at least part of it. I was so unwilling to recognize that I was *in* this business that the first thing I did was get myself killed."

He broke off in a quiet amusement: "That's the stage you're in now, the unwillingness-to-be-involved stage. The this-is-none-of-my-business, how-can-I-get-out-where-no-one-will-bother-me stage. Sorry, Prescott, but it can't be done. You know too much. Until they actually attack, you're poison to them, and I'll wager there's a secret search on for you, almost as hot as for me."

He finished: "Frankly, I'm counting on that Drae powder of yours to disorganize any group protective system now organized. But, first, I want you to buy a map of the city, then we'll look up the home address of Dr. Lauren Kair. If he's no longer practicing on Earth, I'll accept anybody but Dr. David Lester Enright, with whom I once made an appointment."

Prescott said: "I'll be back in ten minutes."

"Oh, no, you won't," said Gosseyn.

He spoke without rancor, but he was suddenly acutely conscious of the psychological reality of the analysis he had made of the Venusian. Prescott was still a tyro all the way. Come back indeed, with perhaps a dozen secret police tailing him. That would be a lovely way to begin the evening.

Gosseyn explained gently: "We're in this together, each the guard of the other. "I'll go into the drugstore behind you, and look up Dr. Kair's address while you buy the map."

It struck him, as they ventured a little later onto a street with shops, that Prescott might still be unconvinced of the utter lack of unhostile legal authority either on Earth or Venus. The doctor might have some obscure idea of trying to contact Venusian friends. Or something. Something dangerous.

It was a remote possibility, but a man who didn't think of such things had no business to feel confident that he had the situation in hand.

Ā might be the science of events in space-time, events about which no one could ever possibly know everything. But that didn't mean that visible possibilities should be disregarded.

Tyros were always dangerous, however intelligent. They did the strangest things, including getting killed. He'd have to watch Prescott with both eyes, and with his mind as well, so long as his own life depended in any way on any action, positive or negative, the other might take.

XI.

"The thalamus is a center of affective reactivity to sensory stimuli, while the cortex is an apparatus for discrimination."

H. P.

They came to the house. Whitely it gleamed in the light from a corner lamp and from two dim globes

that cast a pale radiance around their base, presumably indicating that the family was home.

They vaulted the fence like wraiths. As they paused in the shadows of shrubbery, Prescott whispered:

"Are you sure Dr. Kair is the man you want to see?"

"Yes," said Gosseyn. He was about to leave it at that, when the thought came that the author of "The Solipsist On Non-Aristotelian Venus" deserved better. Gosseyn added: "He's written some books."

It was a very Aristotelian way of putting it, but he was intent now. The house of Dr. Kair, and Dr. Kair himself, offered a unique problem. Here was a residence so protected against intruders by a group system that not even the most skillful gangs operating during the policeless period would dare to try to break in.

The method of entry had to be psychological, and open, and not too involved, with a safe method of escape if the protective system was set in play. Gosseyn whispered:

"This Drae powder you used; it affects the brain?"

"Instantly. It works on the nerves in the upper nostril cavities, thus making a direct path to the brain. One whiff is usually enough. How it missed you is a puzzle to me."

As a null-A, Gosseyn knew that he, too, would sooner or later require an explanation for his own immunity. That there was an explanation he had no doubt. But he could muster little interest in anything like that during this tremendous hour of his life.

In minutes, if nothing went wrong, a great semanticist, specializing on the human brain, would be questioning, examining and diagnosing his brain. *His* brain, the existence of which had drawn Hardie and "X" into a vortex of events, and brought about their death.

Nothing mattered so much as the finding out of the why and how of that strange brain of his.

Gosseyn whispered his plan. Prescott would go to the door, and identify himself as a Venusian. Undoubtedly, before admitting him, Dr. Kair would sound the group warning, placing his neighbors on the alert. But that was unimportant. The Drae powder would take care of an emergency.

Gosseyn asked: "How much of the powder would you use?"

"A pinch—one capsule. I put eight capsules into the air system at the palace, about a teaspoonful. It's very potent."

It was indeed. "How," asked Gosseyn, "will you prevent it from affecting you?"

"There's an antidote, a pill to be taken in advance. Or given afterwards."

"Oh!" said Gosseyn.

He hesitated, fascinated. He hadn't intended to become interested in the powder, but suddenly it was more than just a means to an end. There were numerous questions to ask about it. How was it the gang, with agents on Venus, hadn't known of its existence?

What had impelled Prescott to carry it with him. Why—

Fingers touched his arm. "Here's a pill," said Prescott. "Better take it, just in case the miracle of immunity doesn't work naturally this time."

In the dark, Gosseyn put the tiny oval thing into his pocket.

"I'll use it in an emergency," he said. "I don't think I should affect my brain in any way just before an examination."

Prescott said: "I'd better be ringing that doorbell."

Half a minute later, he was doing just that.

The fog drifted in through the open door with them. By agreement, they left the door partly open. It brought the night, and the safety of the night, closer. For Gosseyn, who was satisfied now with nothing less than every thinkable precaution, that unclosed door was the difference between nerve ease and unease.

Dr. Kair was a tall, huskily built man of fifty, with a smooth, strongly jowled face. As Gosseyn came in, the doctor looked at him curiously with a pair of the most piercing gray eyes Gosseyn had ever seen.

Gosseyn bore the scrutiny quietly. He knew better than to rush this early confidence - building stage. Minutes spent now might save hours later.

Every passing second, he was more impressed with the psychiatrist. The man's decision to admit them had been prompt and without conditions. True, he had set the group-protective system in motion, but only to the extent of placing his neighbors on the alert. Several of those neighbors were listening to this very conversation through a scrambler device that destroyed the meaning, but admitted the general tone. If the tone changed, or there was a shout, however quickly cut off, the entire group would swing into action.

Other neighbors were maintaining a watch on the front and back of the house. In due time, Dr. Kair would reassure them and end the alert. After which there would be half hourly, then hourly checkups.

It was reassuring to Gosseyn, too. But he didn't let the matter drop as easily as that. Traps were traps; and the cleverest men had the most plausible ones. Why had Dr. Kair admitted them so promptly after Gosseyn's name was mentioned?

The psychologist's first answer to that was to disappear into his den. He emerged almost immediately carrying a small lie detector. He grasped the two hand grips firmly, and said:

"Mr. Gosseyn, no Venusian or advanced null-A will accept for a moment the astonishing press and radio statements issued this evening by the government information bureau about President Hardie's assassination. In all my life I have never heard or seen anything so calculated to arouse the emotions of the ignorant, and of the great mass of the half-educated. Not

since the dark ages of the mind has such an attempt been made to appeal to the mob spirit, and the final evidence of their venality is their accusation against Venusians and against the Machine.

"There is unquestionably an ulterior motive behind those statements; and that, in itself, entitles you to a hearing before all just men."

He broke off: "You are, of course, prepared to face a lie detector?"

Gosseyn said huskily: "Anything, sir; so long as I do not have to lose consciousness. I'm sure you can understand the reason for that."

The doctor could. And in all the tests that followed, there was not a single instant when Gosseyn did not have his hands and his mind free.

All the tests! There were dozens; there were scores. For those involving machines, the doctor's laboratory-den, just off the center hall, was ideally located. With two exceptions, all the instruments could be moved to a chair, from which Gosseyn could look slantwise through the den door at the partly open outer door.

Some of the machines glowed at him with hot electronic eyes that warmed his skin and dazzled him. Others were as bright as burnished metal, but cold and unfeelable. Still others showed no visible lights, and yet buzzed or hummed or throbbed with power, as their XYZ unhuman senses examined him.

As test followed test, Gosseyn told his story. Several times he digressed to make explanations, and once he offered the only version he had been able to think up of the relationship between himself and his dead counterpart.

"My idea," he said, "is that there were two of us originally—twins as close to being identical as it is possible for human beings to be. As I see it, the Games Machine noticed that we were mutations, and decided to use us to frustrate the plans of Hardie and 'X', and to discover the nature of the alien life that it believes exists on Venus."

"The alien what?" said Prescott.

He looked startled. He had been silent, an unobtrusive guardian, who peered out of windows of darkened rooms. Twice, he had gone outside and prowled in the fog-ridden yard . . . Gosseyn grimaced at his two hearers.

"I see," he said, "I've gotten ahead of myself. I'll come to the aliens in a moment."

The rest of his account was interrupted three times, twice when he had to hold still while ultrasensitive rays examined the nature of the cells in his extra-brain, and finally when Dr. Kair exclaimed sharply:

"Then you did not yourself kill any of these men?"

Prescott, who had been sitting thoughtful, looked up wearily at the question.

"No, I was the one who did that." He laughed grimly. "I'll have to plead temporary insanity if I'm ever brought to trial."

Dr. Kair did not echo the laughter. "No plea of insanity," he said,

"has ever been accepted from a Venusian by a Venusian judge. You'll have to think of a better story than that."

"Story!" said Gosseyn.

And looked at Prescott. For the first time *really looked at him.*

The man's eyes were ever so slightly narrowed, watching him. One of his hands moved casually towards a gun in his right coat pocket.

It must have been an unconscious action; he couldn't really have expected anything—because Gosseyn beat him to the draw.

"I would say," said Gosseyn quietly a moment later, after they had disarmed the smilingly contemptuous spy, "that the house is surrounded."

The light must now temporarily be their shield. The bright steady light that poked through the long crack made by the partly open outer door. So long as that door remained as it was, the watchers outside would see a blurred shaft of light; and all would seem well to them.

There would, of course, be a limit to their patience and gullibility.

They tied Prescott, hand and foot, and gagged him, all with a swiftness that did not shrink from rough handling. Then they talked over the limitations of their temporary safety.

"He's been outside twice," Gosseyn pointed out soberly. "Now that I think of it, he went at rather regular intervals; and presumably, if he doesn't turn up next time, they come in."

Dr. Kair said: "I don't think we should bother with that now."

"Eh!"

The psychologist's strongly jowled face was calm, his eyes grave.

"What I've discovered about you," he said, "comes first." His tone grew more urgent. "You don't seem to realize, Gosseyn, that you're the important person in all this. There just isn't anything that matters so much, and we've got to take all the attendant risks."

It took time to really accept that, time to assemble his powers of concentration, and to lock the outside danger into a separate compartment of his mind, and leave it there. It even took time to realize that he could listen to the most important information of his individual plenum, and simultaneously carry on vital work.

"What you have in your head," the psychiatrist began, "is not an extra brain in the sense that you now have a higher intelligence potential. That isn't possible. The human brain that created the Games Machine and similar electronic and mechanical organisms has not even theoretically an intellectual equal in the universe.

"People sometimes think that the electronic brain system of the Machine constitutes a development superior to that of man. They marvel at the Machine's capacity to handle twenty-five thousand individuals at once, but actually it can only do so because twenty-five thousand separate electronic brains were

set up in intricate series for just that purpose. And besides these operations are all of a routine nature.

"This is not to say that the Machine cannot think creatively. It is located over a multimetal mine, which is completely under its control. It has laboratories, where robots work under its direction. It is capable of manufacturing tools, and does all its own replacement and repair work. It has a virtually inexhaustible source of atomic energy. The Machine, in short, is self-sufficient and superlatively intelligent, but it has limitations.

"These limitations were implanted from the beginning, and consist of three broadly based directives.

"It must operate the games fairly, within the framework of the laws laid down long ago by the Institute of General Semantics.

"It must protect the development of A in the broadest sense.

"It can kill human beings only when it itself is being directly attacked."

Gosseyn was searching Prescott. *Searching* him! No detail of the man's clothing escaped his probing fingers. The pockets yielded three pistols, extra ammunition, money, a box of Drae powder capsules, a packet of antidote pills and a pocketbook.

He didn't stop with the pockets. He tore the lining of Prescott's Earth-style coat, snatched off his trousers, fingered the band of his hat, wrenched the heels from his shoes—and it was there he found the instrument, an electronic locator device about as large as a thimble, fed by an even smaller atomic battery. Gosseyn stared at the thing.

It must have been with a device like this that Patricia Hardie had been able to run into his arms, pretending she needed protection. He hadn't had time, then, to find out how it had been worked. It was good to know.

Explanations made the mind easy, took a score of tiny strains off the nervous system, and released the body from the thrall of negative excitations for more positive activity. It was easier, suddenly, to listen to the psychologist.

The doctor, too, had been combining activity with conversation. From his very first word, he had started packing the test material into a leather case. Photographs and notes went into the case. He opened machines, and removed recording tubes, wires, screens, rolls of film, ribbons of autotype paper, and special sensitive sound and light tracks. Almost every item, before he packed it, was briefly interpreted:

". . . This proves the new brain is not cortical material . . . and this . . . and this . . . and this . . . that the cells are not thalamic . . . memory . . . association. Here are some of the main channels by which it is connected to the rest of the brain . . . No indication that any impulses have flowed to or from the new gray matter."

He looked up finally: "The evidence shows, Gosseyn, that what you have resembles not so much a brain as the great control systems in the solar plexus and the spine. Only it is the most compact set-up of controls that I have ever seen. The number of cells involved is equal to about a third of the total now in your brain. You've got enough control apparatus in your head to direct atomic and electronic operations in the microcosm, and there just aren't enough objects in the macrocosm to ever engage the full potential control power of the automatic switches and relays now in your brain."

Gosseyn hadn't intended to interrupt. But he couldn't help himself. "Is there any possibility," he said in a strained voice, "that I can learn to integrate that new brain *during the next hour?*"

The answer was a grave shake of the head. "Not in an hour, or a day, or a week. Have you ever heard of George, the boy who lived with the animals?"

Gosseyn smiled a tired smile. It seemed to him, wearily, that everybody he had ever met had mentioned

George. But somehow no one had ever enlarged upon the mention.

It was time that he heard the full story.

George, a two-year-old baby boy, wandered off into the wilderness of foothills and brush behind his parents' farm. Somehow, he fumbled his way into the lair of a renegade female dog, which had just given birth to a litter of pups. Most of the pups died; and the wretched bitch, heavy with milk, its ferocity restrained by dimly remembered human training, had permitted the child to feed.

Later, it hunted food for him, but hunger must have come often, because ants, worms, beetles, anything that moved and had life were found to be part of the boy's diet, when he was captured at the age of eleven, a sullen, ferocious animal, as wild as the pack of dogs, whose leader he had become. His early history was pieced together from his actions and habits.

Grunts, snarls, growls and a very passable bark—that was his language. Sociologists and psychologists realized the opportunity he represented—and failed hopelessly in their efforts to educate him.

Five years after his capture, he had been taught to set up alphabet blocks, spelling out his name, and the names of a few other objects. His aspect at this stage remained bestial. His eyes glowed with easy hatred. He descended frequently and with great agility to all fours; and, even after half a decade, his forest lore was astounding. The tracks of animals, even if hours old, could set him into such a state of excitement that he would jump up and down, and whine with eagerness.

He died at twenty-three, still an animal; a wizened up creature-boy, looking hardly human in the bed of his padded cell. A post-mortem revealed that his cortex had not fully developed, but that it existed in sufficient size to have justified belief that it might be made to function. Dr. Kair ended:

"We could have made George human now with what we know about the brain, but you will agree, I think, that your case and his are similar, with one difference: *You start as a human being.*"

Gosseyn was silent. For the first time, the problem of his extra brain had been clearly defined in the only possible rational way: by analysis and comparison.

Until this moment, his picture of it had been vague and idealistic, disturbing only because the new brain had shown no activity, no reactions whatever. But always, through the blur of his visualizations, hope had blazoned. It had given him a measure of arrogance and of strength in the harder moments of his brief career as a potential savior of civilization. And somewhere inside his skin, permeating possibly his entire nervous system, he had felt pride that he was more than a man.

That would remain of course. It was human to be proud of physical or mental attributes that had come by chance. But as for the rest, as

far as further development was concerned, it would undoubtedly take time. He said doggedly:

"I refuse to believe that the situation is completely hopeless. Something happened that time Thorson experimented with my"—he hesitated—"twin brother. I have a memory, not of what happened, but that *something* happened. And if it could be forced by machines once, there's hope now."

The psychiatrist was smiling, without even a shadow of humor. He said:

"From what you've told me, I would say the first Gosseyn was driven partly insane." His face grew stern. "If you have any notion that I should, in a more careful manner of course, undertake to give you treatments similar to those initiated by Thorson, you have mistaken your man. There is only one way here, the multiordinal method of sanity. I shall be a party to nothing less. If you are a true mutation, the man after man; and should it come down to a choice between saving you and letting these solipsists and their half-human armies assault a peaceful civilization, then you may be sure that I shall choose you. And they"—he smiled grimly—"shall have their opportunity to test out whether Ā can be destroyed by the first adversity. If it can, then it isn't worth saving.

"I must admit," he concluded, "that the possible existence of an alien race that is subtly using a human revolution to further its own attack, does make a difference, but I think we can safely leave the solution of that to the ingenuity of Venusian scientists."

"But they don't know." Gosseyn found his voice. "They don't even suspect."

"That," said Dr. Kair, "underlines with very special emphasis what must be our next move. Our future depends on whether or not we can escape from this house before dawn. And that"—he stood up with astonishingly youthful litheness—"brings us right back to our friend on the couch over there."

It was easy to think again of urgent and deadly danger.

John Prescott, solipsist. That much identification was admissible, with the proviso that the word "solipsist" was defined as expressing wholeness of egotism, much as "plenum" expressed "fullness" as opposed to the "emptiness" of "space".

The man lay on the couch, and his eyes watched them. His blond hair seemed curiously whitish in the strong light. The faintest sneer lurked in the crinkles of his lips, in spite of the slightly bulging gag inside his mouth.

"I would say," said Dr. Kair, "that we've got quite a high official of the gang here. A man who took it upon himself to kill Hardie must have had hopes that it would improve his position in the top executive group. Or possibly he carried out the orders of a secret inner council, of which 'X' was merely an agent, not a member."

Gosseyn pondered the possibility. It seemed incredible now that his

first reaction to "X" 's death, even though he himself had not intended killing him, had been a half-relieved conviction that the gang was through. Every hour, his conception of the gang took on vaster proportions.

Their plans were colossal, and they shrank at nothing. In the final crisis, they had killed their own front men, in order to start a hate campaign that would enable them to launch their first attacks in an atmosphere of lies, innuendo and confusion. And then, in order to fool him into believing he had a friend in Prescott, they had—

Gosseyn said in a queer tone:

"You know, there's something horrible here. This man allowed his wife to be murdered as a mere incident in the campaign to convince me of his bona fides."

Dr. Kair's gray eyes grew thoughtful. "Are you sure she's dead? That could have been an act."

Gosseyn doubted it. That last, intense look she had given him—and what she had said that first day on Venus. Nevertheless, it might have been an act. And besides, the man was more valuable alive than dead.

It was time to stop thinking. *And move!* For more than half an hour, there had been a plan in his mind. He said:

"If we're going to make assumptions, let's assume that cunning is better than force, and that one of us can pass himself off as Prescott, if we work at it a little."

He broke off swiftly: "What about your wife: is she here? I've been intending to ask. And children. Any children?"

"Three—but not here. Venusian born children cannot visit Earth till they're eighteen. At the moment, my wife is with them in Chicago, Venus."

They smiled at each other, the doctor looking oddly gleeful. He had a right to be. They were alone with their great problem: two men, one, the doctor, of great attainments in his field; the other—well, the other still had to prove himself.

They decided without argument that Dr. Kair would go out to contact the gang's agents. His white hair, his build, gave him an appearance roughly similar to that of Prescott. It should suffice in the dark.

Prescott's shoes, while a little long and half a size too narrow, fitted Kair. It seemed wise to wear the shoes that contained the locator.

Imitating Prescott's voice was comparatively easy. Like all trained speakers, like all Venusians, the psychiatrist had full control of the seven resonance chambers in his body and head. With a recent memory of Prescott's voice, and with Gosseyn there to check on the subtleties of tone, he had the imitation pat in three minutes, including an identifiable *sotto voce*.

"And now," said Gosseyn in a steely voice, "we'll find out from the gentleman himself the details of his arrangements with his friends outside."

He bent down, and removed the

gag; and the disgust he felt must have been in his manner; or perhaps Prescott was persuaded by a knowledge of what he would have done to secure information under similar circumstances. Whatever the reason, he said without prompting:

"I have no objection to telling you that there are only a dozen men outside, and they have orders to follow you, not arrest you. I was supposed to go out again about now, to let them know everything was all right. The all-clear word is 'Venus'."

Gosseyn nodded to the psychiatrist. "All right, doctor," he said, "I'll expect you back in five minutes. If you're not, I'll suppress my squeamishness, and put a bullet through Prescott's head."

The doctor laughed. "Maybe it would be just as well if I stayed six or seven minutes."

His laughter faded, as he reached the door. The door moved slightly as he slipped through the opening. And then—then he was gone into the night and the fog.

Gosseyn glanced at his watch. "It is now ten minutes after four," he said to Prescott. And drew his gun.

A tiny bead of perspiration started a path down Prescott's cheeks. The sight amazed Gosseyn, until he remembered that solipsists, too, were neurotics.

It gave him an idea. He looked down again at his watch. The second hand, which had been at ten was now at forty-five. Thirty-five seconds had passed.

"One minute," said Gosseyn.

Physiological time was a flux of irreversible changes of the tissues and humors. But inward time depended on the human system, on variable circumstances, and on each individual. It changed under stress. Duration was as firmly wedded to man and his momentary emotions as life was to the nervous system.

The second hand was twitching towards the ten, completing its first round. Accordingly, one minute had actually passed since the departure of Dr. Kair.

"Two minutes," said Gosseyn in an implacable tone.

Prescott said in a low, harsh jittery voice:

"Unless Kair is a fool, he should be back in five minutes, but the contact agent out there is a talkative idiot. Take that into account, and don't be too hasty."

After a minute and a half altogether had gone by, Prescott began to sweat profusely.

"Three minutes," said Gosseyn.

Prescott protested: "I told you the truth. Why shouldn't I? You can't escape our dragnet for long. One week, two weeks, three weeks —what does it matter? After listening to Kair, it's clear to me that your chance of gaining control of that extra part of your mind is almost zero."

It was curious, listening to the man talk, and at the same time picturing Dr. Kair out in the fog of that pre-dawn night. His watch

said that the psychiatrist had been gone only two minutes.

"Four minutes!" said Gosseyn.

It startled him a little. If a weak link was going to snap in the tensed mind of the solipsist, it would have to be soon now. He leaned forward, expectant, his questions quivering on the tip of his tongue.

"Another reason I told the truth," Prescott babbled, "is that I am no longer convinced even a superman could interfere with the interplanetary operations which are now about to be launched. The organization has been overcautious in your case."

Gosseyn's watch showed twelve and one half minutes after four. According to the accelerated time sense working on Prescott's nervous system, the five minutes allotted for Dr. Kair's absence, was up.

It was too fast, it seemed to Gosseyn. By telescoping time in half, he hadn't given Prescott the opportunity to get really upset. It was too late to slow down. If the man was going to break, now was the time.

"The five minutes are up," he said decisively. He raised his gun.

Prescott's face was a strange, livid color.

"Gosseyn," he whispered, "I'm not an easily frightened man, but it struck me with a shock a few minutes ago that I might be betrayed. If you shoot me, you play right into Kair's hands."

"Oh!" said Gosseyn, and his tone was resigned.

He knew what was coming. He should, he realized, have guessed it in advance. The man was playing for time, and, unless checked sharply, his mind would plunge wildly in every direction concocting half plausible explanations. Curious, how the desperate mind forgot logic, and palpitated with childish thoughts.

And these people, these unintegrates were going to try to get back the control of the Solar System.

"Don't you understand," Prescott breathed, "*I* brought you here. Kair is one of us. The real Kair, according to a note in the city registry, has been back on Venus since last year. You can check on that. There's a registry in the hall beside the communicator."

Gosseyn pointed out coldly that it was he, not Prescott, who had looked up Dr. Kair's address. He rushed on, conscious that he mustn't give the man opportunity to think up another story, not so easily disprovable. He said savagely:

"I'm going to give you one more minute, Prescott. And if you haven't started talking then, or if Kair isn't back, you're through. What I want to know is, where did 'X' or the gang get the instrument they use to corrupt the Games Machine? And where is that instrument now?"

The words spoken, he glanced, for the sake of emphasizing the time limit, at his watch. He stared, startled; and, briefly, forgot his purpose with Prescott. The time was fourteen minutes after four.

Four minutes! He had an empty feeling, a qualm; the first shocked

thought that Dr. Kair had been gone a long time. He saw that Prescott was gray, and that steadied his own nerves. Prescott said in a curious uneven tone:

"The Distorter is in Patricia Hardie's apartment. We built it in to look like a part of one wall; and she doesn't know it's there."

The man looked on the verge of collapse; and his story had the sound of truth. The "Distorter"—the very naming of it was a partial verification—*had* to be located near the Machine; and they would obviously try to conceal it. Why not in Patricia Hardie's room?

He suppressed an impulse to run and get the lie detector. Suppressed it because he had Prescott on the run, and the introduction of a machine might be fatal.

But he couldn't prevent himself from taking another glance at his watch. It was 4:15 a. m. Gosseyn glared at the door. Time was calling his bluff, if it was a bluff. He began to understand the pressure Prescott had endured. With an effort he forced his attention back to the man.

"Where," he urged, "did you get the 'Distorter'?"

"There's a Venusian detective called Crang," Prescott mumbled. "He—"

A sound at the door silenced him. He relaxed with a sick grin, as Dr. Kair came in. The psychiatrist was breathless.

"No time to waste," he said. "It's getting light outside, and the fog is beginning to clear. I told them we were leaving right away. Come on."

He snatched up the leather case, containing the test material about Gosseyn's brain. Gosseyn stopped him long enough for them to gag Prescott, long enough for him to think, and say:

"But where are we going?"

Kair was as gleeful as a boy who has tasted adventure:

"Why, we're taking my private roboplane, of course. We're going to act just as if we're not being watched. As to *where* we're going, I'm sure you don't expect me to mention that in front of Mr. Prescott, do you? Particularly since I'm going to drop his shoes, with the locator device in them, before we're clear of the city."

In five minutes they were in the air. Gosseyn looked out into the pressing fog, and felt the exultation gathering in him.

They were actually getting away.

XII.

"Even Leibniz formulated the postulate of continuity, of infinitely near action, as a general principle, and could not for this reason become reconciled to Newton's Law of Gravitation, which entails action at a distance." H. W.

Gosseyn compared his awareness of the night and the fog to the physical world as it appeared to man's senses. He caught glimpses of vague masses of light far below, and once in a while there were rifts in the mist, with the ground or the

shiny streak of a winding stream showing through.

So might a scientist see a part of the object whose meaning he was trying to study. The important thing with himself—and the scientist—was to make the null-A assumption that there was a real universe down there that would seem stable if ever seen in broad daylight.

Only mental children were afraid of the dark or the fog.

The attempt to view his situation as a whole worked, as it had for centuries now with other men, whenever they gazed at an object and realized there were realities connected with it that they couldn't see, as well as realities that they could.

The first product of that large visualization was: His exultation dimmed greatly. He sank deeper into his seat, and glanced at Dr. Kair. The psychologist sat, eyes still open, but very sleepy looking. Gosseyn said:

"Doctor, what is Venus like . . . the cities, I mean?"

The doctor rolled his head sideways to look at Gosseyn, but did not move his body.

"Oh, much like Earth cities, but suited to the perpetually mild climate. Because of the high clouds, it never gets too hot. And it never rains except in the mountains. But every night on the great verdant plains, there's a heavy dew. And I mean heavy enough to look after all the luxurious growth. Is that what you're getting at?"

It wasn't. "I mean the science," Gosseyn frowned. "Is it different? Is it superior?"

"Not one wit. Everything ever discovered on Venus is immediately introduced on Earth. As a matter of fact, research on Earth is ahead of Venus on some things. Why shouldn't it be? There are more people here; and specialization makes it possible for even minds of middling intelligence and quite unsane to invent and discover."

"I see." Gosseyn was intent now. "Tell me, then: From your knowledge of Earth and Venusian science, what is the explanation for two bodies and the same personality?"

"I intended to think about that in the morning," said Dr. Kair wearily.

"Think about it now." Gosseyn was persistent. "Is there any explanation on the basis of solar science?"

"None that I know of."

"How about the Distorter that has made it possible for the gang to get thousands of its men selected as winners in the games?"

He explained what Prescott had told him about the Distorter. When he had finished, the psychologist was frowning.

"There's no question, Gosseyn. You've hit at the heart of this situation. Who discovered those absolutely radical processes? I have no doubt there have been some potent biological experiments undertaken in the Solar System by semantically trained biologists. But two bodies, and a new brain! And that Distorter."

"Notice," said Gosseyn softly, "that both sides have something. The miracle of my strange immortality was a product of somebody who *opposes* the group that owns the Distorter. And yet, doctor, my side—our side—is afraid. It must be. If it had comparable strength, it wouldn't play this hidden game."

"Hm-m-m, you seem to have something there."

Gosseyn had no doubt of it. There was an idea struggling in the back of his head, an idea so big that it wouldn't come all the way in. His brain didn't seem big enough to hold it.

"Doctor, if you were a human being, important enough to make decisions of planetary importance on your own, what would you do if you discovered that a revolutionary party was organizing to seize power?"

The older man snorted. "I'd rouse the people. The strength of Ā has yet to be tested in battle, but I have an idea it'll show up well."

"Suppose," urged Gosseyn, "when you discovered what was going on, that the preparations of the gang were already too far advanced? Suppose your revelation would merely precipitate events?"

"Well—"

"And besides, suppose you agreed with the semantic historians: that all the wars ever fought could have been avoided except for the pride and bloodlust of the participants.

"Look at me," Gosseyn continued. "I'm surely a reasonably good example of a person who believes in Ā. And yet, I'm beginning to get excited about this war. My only fear is that it will come before our side has even started to get ready. I'm half-paralyzed by the possibility that they may be caught completely off-guard."

He went on: "If, as you suggested, the person *behind* my two bodies had sent out clarion warnings of danger, all null-As would have ceased to be null-As to the extent that they yielded to fear and other emotional upsets. It might take generations to re-establish integration as it now exists, although, since I didn't break, I must assume that others won't either. Nevertheless, there is the bloodshed angle, and the futility."

Dr. Kair mumbled sleepily: "I see what you mean. But you still haven't explained your two bodies and the Distorter. Who's the great man on the other side? Or on our side, for that matter?"

Who indeed?

Several minutes passed before Gosseyn spoke again:

"Where are we going, doctor?"

Dr. Kair perked up for the first time. "There's a cabin," he said, "on an isolated shore of Lake Superior, where I stayed for a couple of months three years ago. It seemed such an ideal place for quiet thought and research that I bought the place. And then never went back somehow."

He smiled wryly. He finished:

"I'm pretty sure we'll be safe there for a while."

Gosseyn said: "Oh!"

He sat, then, estimating the time that had passed since their flight began. He decided half an hour had gone by.

Not bad, in a way. A man who could in thirty minutes realize that the enticing easy path was not for him, had come a long distance towards domination of his environment.

It *was* enticing to think of lying for hours on some sandy beach, with nothing to do but take mind exercises—in a leisurely fashion—under the guidance of a great scientist. The one flaw in the picture was a rather tremendous one:

It wouldn't be like that at all.

He pictured Dr. Kair's cabin hideout. There would be a village nearby, and perhaps some farms and fishermen's homes. Three years before, with a clear conscience, intent on his own purposes, the psychiatrist would have been almost unaware of these addenda of his surroundings. He had probably caught up on his reading, gone for meditative walks on lonely shores; and the occasional habitant whom he met would have been a person seen, but not really considered.

That didn't mean that the doctor himself would have been unremarked. And the chances of two men coming to that cabin immediately after the assassination of Hardie, and not being closely observed, was—well, it was zero.

Gosseyn sighed. It was his own case all over again. In the same way that he had been caught into a whirlpool of events, so was the psychologist now beginning to spin on the outer rim of the treacherous waters. He himself had continuously failed to understand how small one man was in comparison to the mighty organization that had set itself against him. And so, within twenty-four hours of his first awareness that something was wrong, he had been killed.

Miraculously returned to life in a new body, he had been hunted ever since. Only now, for the first time, he had a limited freedom to act on his own.

It would be different if Dr. Kair had been able to promise early results with his extra-brain. But he hadn't. And so, he was back where he had started the evening.

He was in this affair, *in* it as deep as he could go. And there was no turning back, no time for settling down on some lake shore pasture, there to vegetate, while a revolution and a far more sinister alien war, rocked the inhabited worlds of the Solar System.

Gosseyn stole another look at the doctor. The man's shaggy head was drooped against the back of his seat; his eyes were closed. His chest rose and fell with regularity. Softly, Gosseyn called:

"Doctor!"

The sleeper slept on.

Gosseyn waited a minute, then slipped gently to the controls. He set them to make a wide half circle, and then head back in the direction from which they had come. He re-

turned to his seat, took out his notebook, and wrote:

Dear Doctor:

Sorry to leave you like this, but if you were awake, we'd probably only argue. I am very anxious to undergo mind training, but there are urgent things to do first. Watch the evening paper personals. Look for an ad signed by Guest. If answer is necessary, sign yourself Careless.

He stuck the note into the controls. And then strapped on one of the ingravity parachutes. Twenty minutes later, the atomic light of the machine showed through the fog.

Once more, Gosseyn set the controls for a wide half circle, so that the plane would return to its original course.

He waited till the blazing beacon of the Games Machine was like a raging fire below him, then slightly behind. He saw the vaguely shaped buildings of the presidential residence just ahead. When the plane was almost over the palace, he pulled the trigger of the exit door. Instantly, he was falling through the foggy darkness.

Already, dawn was brightening the mists to the east.

The ingravity parachute was in its entirety a product of purest

null-A thinking. Its discoverer had actually sat down, and consciously and deliberately worked out the mathematical principles involved, and then he had superintended the construction of the first plates.

It did its work within the limitations of that law of gravity which said that it was easier for two objects in space to fall towards each other than away from each other, with the smaller of the two doing most of the actual falling. Only an applied force could change this tendency; and applied forces had tendencies of their own that usually included bulkiness, weight and a capacity for being dangerous when used in close proximity to human beings.

There were still Aristotelians around who had fuzzy ideas about making things "fall" upwards, and who talked semantic rubbish about nothing being impossible. Non-Newtonian physics, the physics of the real world, recognized the urge of the two bodies to fall towards each other as an invariant of Nature, and simply adjusted their ehrenhaft structures to slow the fall.

The ingravity parachute resembled a metal harness with pads to protect the body where the pressure was greatest. It had power attachments, but they were only for use to maneuver sideways during the fall. The slowest rate of fall ever clocked was approximately five miles per hour. Which meant that the device had an efficiency of slightly better than ninety percent.

Accordingly it rivaled the electric motor, the steam turbine, the atomic drive for spaceships and the suction pump as a "perfect" machine.

By pressing the proper power buttons, Gosseyn had no trouble landing squarely on the balcony that led into Patricia Hardie's apartment. He would have liked to pay the Games Machine a visit first, but that was out of the question: the Machine would be guarded like the crown jewels of olden days.

Nobody would think of him coming back to the palace. Gosseyn decided to be very convinced of that.

He took the slight blow of the landing with bended knees, and came up like a boxer, on his toes. The parachute was a zipper affair: one tug, and he was out of it. He lowered it swiftly but gently to the floor. And then he was at the French doors.

He fully expected they would be locked, and he had an automatic with a silencer on it in his fingers, ready to smash any resistance. But first he tried the latch.

The doors opened with a thin, sharp click. Gosseyn didn't worry about the sound. His plan was based on speed, on a very clear memory of where Patricia Hardie's bed had been located, and on the conviction that it would be just as well to assume that she thought he had killed her father.

Therefore, she might dislike him. Therefore pin her down, and choke off any yells she might attempt, gag her, and then, with the situation under firm control, make sure the

windows were electronically darkened. And finally put on the lights and start talking.

Gosseyn did not time himself. He merely finished everything as he had scheduled, and said:

"Sorry if I was rough with you."

He was sorry. But there was more behind the words than that. He hoped to effect his escape from the palace with her help. He *had* to win her over.

He saw that she was fully dressed. She had also been crying, and her hair was a mess; there were dark rings around her eyes. Curiously, her eyes were looking, not at him, but to his right.

Gosseyn whirled.

From the living room doorway, Eldred Crang said: "I wouldn't try anything."

There were two men with submachine guns on either side of the erstwhile Venusian detective. The accurate way they were pointing their weapons impressed Gosseyn. He put up his hands, as Crang spoke again:

"It was very silly of you, Gosseyn, to think that an airplane could fly directly over the palace. However, I've got a surprise for you. Prescott was released a little while ago, and he called up. On the basis of his report we have come to a final decision about you."

The words seemed to have no sense. Gosseyn, tensed for death, waited for the smashing bullets.

"It struck us some little while ago," said Crang, "that whoever planted you here that first time *desired* us to kill you. When we obliged, you were promptly brought onto the scene again, this time on Venus, to accomplish a limited objective. The idea then was that we kill you once more, so that the third Gosseyn might appear on the scene.

"Well, we refuse." His yellow eyes were pools of reflected light. "You see, Gosseyn, if we don't kill you, there's no one else who will do so, except you yourself—*or some other agent of the invisible chess player.*

"Since we are convinced that we can trace your murderer after the event, we have decided to release you unconditionally."

Gosseyn, intent on the possibility that he might be able to snatch one of his own guns, felt a vague puzzlement, a consciousness that there was something wrong with the words that he had heard. He gathered them together again in his mind; and this time they penetrated.

"You're going to WHAT?" he said.

"The charges against you," said Crang in a precise voice, "are being dropped. All police stations are being notified to that effect. At this moment you are free. Nothing that you, with your limitations, can do, matters to us. It is too late to interfere with our plans. You may tell anybody you please anything you please."

He was smiling but unfriendly. "Guards," he said, "take this man up to his apartment, have Meggins give him breakfast and fit him with

street clothes. Let him remain there until about nine o'clock, but he can leave earlier if he desires."

Day was bright though still misty over the world of the city of the Machine, as Gosseyn emerged into the open shortly after nine o'clock.

He still didn't believe a word of it.

XIII.

"Excitation rather than inhibition is important in correlation because from what has been said it appears that so far as known inhibition is not transmitted as such. The existence of inhibitory nervous correlation is, of course, a familiar fact, but in such cases the inhibitory effect is apparently produced, not by transmission of an inhibitory change, but by transmission of an excitation and the mechanism of the final inhibitory effect is obscure." C.M.C.

Out on the street, Gosseyn said softly to himself: "Somebody will be following me. They won't just let me wander off into remoteness."

He was the only person who got onto the bus at the head of the street. He watched the gray pavement slide away behind the machine. About two blocks to the rear was either a black or blue coupé; he couldn't be sure of the color.

He sighed as it turned onto a side street out of sight. A very fast car came from the far distance of the hilly suburban country beyond the palace, and raced past the bus, which was stopping again for a woman.

She paid him no attention, but he kept his surreptitious gaze on her until she got off after twenty blocks or so.

"Maybe," he decided, "they've guessed where I'm going"—first the hotel, then the Games Machine.

Meggins had provided him with street clothes all right, but the only money he had was what he had taken from Prescott the night before: three fives and seven ones, twenty-two dollars in all.

Therefore the hotel, where the first Gosseyn had left his possessions, including some two hundred dollars in paper money. The hotel clerk said:

"Sign here, please."

Gosseyn hadn't thought of that. He took the pen, a vision of jail looming up. He signed with a flourish; and then smiled to himself, as he realized what an almost nerveless person he had become.

He watched the clerk disappear into a back room. Half a minute later, the man emerged with a key.

"You know the way to the vault," he said.

Gosseyn did. But he was thinking: "Even my signature's the same, an automatic sameness."

The explanation for such identity had better be good.

He spent ten minutes rummaging through the suitcases. There were five shirts, another suit, a dozen pairs of socks, a pair of shoes, three ties, a leather case containing soap and a tube of Thirty-Day shaving salve, and some odds and ends of apparel: shorts, undershirts.

pajamas, handkerchiefs, but not a letter, not a document.

According to *his* memory of Gosseyn 1's memory, he had come to the hotel from California by air. There should have been some records, a ticket stub. Something.

There was nothing. He found the money, where he had stuffed it, in a vest pocket. He peeled off seventy-five dollars in tens and fives, and returned the key to the desk.

Out on the street, a paper boy's shout brought remembrance of the wild announcements and accusations of the night before.

The president's death made the expected huge headline, but the write-ups below had been toned down almost beyond recognition:

". . . Gosseyn exonerated . . . A thorough investigation being made . . . Administration officers admit many foolish statements given out immediately after murder . . . due process of law."

It was a backing down with a vengeance. But it was clever too, the easy cleverness of those who have unlimited strength behind them. The seed of suspicion of Venus and the Machine had been planted. At the proper time it would be made to sprout.

There was a tiny item on the first page of the second section, which interested Gosseyn. It read:

NO NEWS FROM VENUS

The Radio Exchange reports that no contact could be established this morning with Venus.

Editor's Note: This is regarded with some amusement in news circles, as no news ever does come from Venus, the contact with the Radio Exchange being purely perfunctory.

The report depressed Gosseyn, because it drove home a reality that had been nibbling at the outer ramparts of his mind ever since he had left the palace.

He was back in the depths, back with the five billion people, who knew nothing except what they were told; back in the darkness.

It was worse than that. He was free. He could discount most of the nonsense Crang had spouted at him, but the reality of the freedom could not be gainsaid. He who had been keyed up by danger to actions that smacked of sheer melodrama in retrospect, had had the danger taken from him.

. . . Imagine dropping on the palace in a parachute on the night of the assassination of President Hardie. It was the act of a madman, certainly beyond the capacity of an ordinary law-abiding individual like Gilbert Gosseyn.

But surely they would prevent him from getting in to see the Machine.

Gosseyn hoped so with all his action-demanding soul.

Nobody stopped him. The great avenues leading to the Machine were almost deserted. Which was not surprising on this the twenty-seventh day of the games. More than ninety percent of the competitors must have been eliminated by now; and their absence showed.

Inside a cubbyhole of the type used for the early part of the games, Gosseyn picked up the metal contacts necessary to estab-

lishing *rapport,* let his mind relax. And waited.

After about half a minute, a voice spoke from the wall speaker in front of him:

"So that's the situation, is it? What are your plans?"

The question shocked Gosseyn *His* plans! He had come for advice, even—he was loathe to admit it—instructions. His own ideas about his future were so obscure that it was improper to call them plans.

"I've been caught off balance," he confessed. "After living on danger, the fear of death, and a sense of harrowing urgency, I have suddenly had the whole load lifted from my shoulders. I'm back in purgatory with rooms to locate, a living to make, and all the wretched details of a low-income existence to attend to. My only plan is to talk to some of the professors at the Semantics Institute, and get in touch with Dr. Kair. Somehow, the Venusians have to be warned of their danger."

He paused; and the Machine said: "The Venusians know. They were attacked sixteen hours ago by five thousand spaceships and twenty-five million men. They—"

Gosseyn said. "W-H-A-T?"

"At this moment," said the Machine, "the great cities of Venus are in the hands of the conquerors. The first phase of the battle is accordingly over."

Limply, Gosseyn let go of the metal contacts. He was shaking, and there was in him a stark and terrible dismay that completely overrode the enormous respect he had always had for the Machine.

"And you didn't warn them," he raved. "Why, you incredible monster. You soulless, mechanical thing. You—"

"You have, I believe," said the Machine coolly, "heard of an instrument called the Distorter. I can make no public statements while that thing is focused on me."

Gosseyn, whose lips had been parted for a fresh barrage, closed them, and sat silent, as the Machine went on:

"An electronic system of brains is a very curious and limited structure. It works by a process of intermittent power flow. In this process, the denial of power at the proper split instants is as important as the flow during other split instants.

"The Distorter permits only the flow of energy, not the hindrances or the variances. When it is focused on any portion of me, the particular function to which it is attuned, ceases to have inhibitions. In photoelectric cells, thyratrons, amplifiers; in the intricate electrocerebrals, and in every part of me, the flow of energy becomes uniform and meaningless.

"Constantly under the influence of this, the most baneful weapon that has ever struck at a way of life, is my system of public communicators."

Gosseyn said blankly at that point: "But what are we going to do?"

"I can do nothing."

The accent on the pronoun was

not lost on Gosseyn. "You mean, I can do something?"

"It all depends," said the Machine, "on how completely you understand that Crang's analysis of the situation was masterly."

Gosseyn threw his mind back to what Crang had said. All that nonsense about why they weren't going to kill him, and about—

Good heavens!

"Now, see here," he said loudly, "you don't really mean that I'm supposed to kill myself."

"I would have," said the Machine, "shot you the moment you came in here today, if I had been able. But I can only kill human beings in self-defense. That is a permanent inhibition upon my powers."

Gosseyn, who had never thought of danger from the Machine, rasped:

"What is going on here? What's up?"

The Machine's voice seemed to come from a long way off: "Your work is done," it said. "You accomplished your purpose. But now you must give away to the third and greatest Gosseyn. It is possible," the cool voice went on, "that you could learn to integrate your extra-brain in this body, given time. But there isn't time available. Accordingly, you must make way for Gosseyn III, whose brain will be integrated from the moment he comes to conscious life."

Gosseyn wondered if *his* brain would stop pulsing before it burst out of his head.

"But that's ridiculous," he breathed. "I can't kill myself."

He caught himself with a horrible effort. "Why can't this . . . this third Gosseyn come to life without my dying?"

"Because only the disintegration of certain parts of your cerebrum can 'set off' the process of consciousness for him."

"What is all this?" said Gosseyn. "What do you think you're pulling, telling me a story like that? WHO AM I?"

"That I cannot tell you, in case the gang ever gets hold of you again. There are powerful reasons why they should believe that you do not know."

"But they already know. They even told Gosseyn I, but the knowledge didn't come along to my body."

"What you were told," the Machine said, "was for the benefit of Hardie and 'X'. Since the information was false, it was automatically eliminated from the knowledge of the second body."

"You mean Prescott and Thorson and Crang know who I really am?"

"They do," was the cold reply. It broke off: "But this is futile. We have unquestionably suffered a tremendous setback in their refusal to kill you. It is a tenet of psychologics that sane people do not commit suicide. And yet, you must! And soon. Soon!

"And now, I am sorry to say it will be useless for you to ask any

(*Continued on page 166*)

Uncommon Sense

by HAL CLEMENT

***Clement,** an astrophysicist by training, B-24 pilot by current profession, suggests a very specialized sense for a very special sort of planet—and that a man who really uses his sense can make out.*

Illustrated by Williams

"So you've left us, Mr. Cunningham!" Malmeson's voice sounded rougher than usual, even allowing for headphone distortion and the ever-present Denebian static. "Now, that's too bad. If you'd chosen to stick around, we would have put you off on some world where you could live, at least. Now you can stay here and fry. And I hope you live long enough to watch us take off—without you!"

Laird Cunningham did not bother to reply. The ship's radio compass should still be in working order, and it was just possible that his erstwhile assistants might start hunting for him, if they were given some idea of the proper direction to begin a search. Cunningham was too satisfied with his present shelter to be very anxious for a change. He was scarcely half a mile from the grounded ship, in a cavern deep enough to afford shelter from Deneb's rays when it rose,

and located in the side of a small hill, so that he could watch the activities of Malmeson and his companion without exposing himself to their view.

In a way, of course, the villain was right. If Cunningham permitted the ship to take off without him, he might as well open his face plate; for, while he had food and oxygen for several days' normal consumption, a planet scarcely larger than Luna, baked in rays of one of the fiercest radiating bodies in the galaxy, was most unlikely to provide further supplies when these ran out. He wondered how long it would take the men to discover the damage he had done to the drive units in the few minutes that had elapsed between the crash landing and their breaking through the control room door, which Cunningham had welded shut when he had discovered their intentions. They might not notice it at all; he had severed a number of inconspicuous connections at odd points. Perhaps they would not even test the drivers until they had completed repairs to the cracked hull. If they didn't, so much the better.

Cunningham crawled to the mouth of his cave and looked out across the shallow valley in which the ship lay. It was barely visible in the starlight, and there was no sign of artificial luminosity to suggest that Malmeson might have started repairs at night. Cunningham had not expected that they would, but it was well to be sure. Nothing more had come over his suit radio since the initial outburst, when the men had discovered his departure; he decided that they must be waiting for sunrise, to enable them to take more accurate stock of the damage suffered by the hull.

He spent the next few minutes looking at the stars, trying to arrange them into patterns he could remember. He had no watch, and it would help to have some warning of approaching sunrise on succeeding nights. It would not do to be caught away from his cave, with the flimsy protection his suit could afford from Deneb's radiation. He wished he could have filched one of the heavier work suits; but they were kept in a compartment forward of the control room, from which he had barred himself when he had sealed the door of the latter chamber.

He remained at the cave mouth, lying motionless and watching alternately the sky and the ship. Once or twice he may have dozed; but he was awake and alert when the low hills beyond the ship's hull caught the first rays of the rising sun. For a minute or two they seemed to hang detached in a black void, while the flood of blue-white light crept down their slopes; then, one by one, their bases merged with each other and the ground below to form a connected landscape. The silvery hull gleamed brilliantly, the reflection from it lighting the cave behind Cunningham and making his eyes water when he tried to watch for the opening of the air lock.

He was forced to keep his eyes elsewhere most of the time, and

look only in brief glimpses at the dazzling metal; and in consequence, he paid more attention to the details of his environment than he might otherwise have done. At the time, this circumstance annoyed him; he has since been heard to bless it fervently and frequently.

Although the planet had much in common with Luna as regarded size, mass, and airlessness, its landscape was extremely different. The daily terrific heatings which it underwent, followed by abrupt and equally intense temperature drops each night, had formed an excellent substitute for weather; and elevations that might at one time have rivaled the Lunar ranges were now mere rounded hillocks, like that containing Cunningham's cave. As on the Earth's moon, the products of the age-long spalling had taken the form of fine dust, which lay in drifts everywhere. What could have drifted it, on an airless and consequently windless planet, struck Cunningham as a puzzle of the first magnitude; and it bothered him for some time until his attention was taken by certain other objects upon and between the drifts. These he had thought at first to be outcroppings of rock; but he was at last convinced that they were specimens of vegetable life—miserable, lichenous specimens, but nevertheless vegetation. He wondered what liquid they contained, in an environment at a temperature well above the melting point of lead.

The discovery of animal life—medium-sized, crablike things, covered with jet-black integument, that began to dig their way out of the drifts as the sun warmed them—completed the job of dragging Cunningham's attention from his immediate problems. He was not a zoologist by training, but the subject had fascinated for years; and he had always had money enough to indulge his hobby. He had spent years wandering the Galaxy in search of bizarre life forms—proof, if any were needed, of a lack of scientific training—and terrestrial museums had always been more than glad to accept the collections that resulted from each trip and usually to send scientists of their own in his footsteps. He had been in physical danger often enough, but it had always been from the life he studied or from the forces which make up the interstellar traveler's regular diet, until he had overheard the conversation which informed him that his two assistants were planning to do away with him and appropriate the ship for unspecified purposes of their own. He liked to think that the promptness of his action following the discovery at least indicated that he was not growing old.

But he did let his attention wander to the Denebian life forms.

Several of the creatures were emerging from the dust mounds within twenty or thirty yards of Cunningham's hiding place, giving rise to the hope that they would come near enough for a close examination. At that distance, they were more crablike than ever, with round, flat bodies twelve to eighteen

inches across, and several pairs of legs. They scuttled rapidly about, stopping at first one of the lichenous plants and then another, apparently taking a few tentative nibbles from each, as though they had delicate tastes which needed pampering. Once or twice there were fights when the same tidbit attracted the attention of more than one claimant; but little apparent damage was done on either side, and the victor spent no more time on the meal he won than on that which came uncontested.

Cunningham became deeply absorbed in watching the antics of the little creatures, and completely forgot for a time his own rather precarious situation. He was recalled to it by the sound of Malmeson's voice in his headphones.

"Don't look up, you fool; the shields will save your skin, but not your eyes. Get under the shadow of the hull, and we'll look over the damage."

Cunningham instantly transferred his attention to the ship. The air lock on the side toward him—the port—was open, and the bulky figures of his two ex-assistants were visible standing on the ground beneath it. They were clad in the heavy utility suits which Cunningham had regretted leaving, and appeared to be suffering little or no inconvenience from the heat, though they were still standing full in Deneb's light when he looked. He knew that hard radiation burns would not appear for some time, but he held little hope of Deneb's more deadly output coming to his assistance; for the suits were supposed to afford protection against this danger as well. Between heat insulation, cooling equipment, radiation shielding, and plain mechanical armor, the garments were so heavy and bulky as to be an almost insufferable burden on any major planet. They were more often used in performing exterior repairs in space.

Cunningham watched and listened carefully as the men stooped under the lower curve of the hull to make an inspection of the damage. It seemed, from their conversation, to consist of a dent about three yards long and half as wide, about which nothing could be done, and a series of radially arranged cracks in the metal around it. These represented a definite threat to the solidity of the ship, and would have to be welded along their full lengths before it would be safe to apply the stresses incident to second-order flight. Malmeson was too good an engineer not to realize this fact, and Cunningham heard him lay plans for bringing power lines outside for the welder and jacking up the hull to permit access to the lower portions of the cracks. The latter operation was carried out immediately, with an efficiency which did not in the least surprise the hidden watcher. After all, he had hired the men.

Every few minutes, to Cunningham's annoyance, one of the men would carefully examine the landscape; first on the side on which he was working, and then walking

around the ship to repeat the performance. Even in the low gravity, Cunningham knew he could not cross the half mile that lay between him and that inviting air lock, between two of those examinations; and even if he could, his leaping figure, clad in the gleaming metal suit, would be sure to catch even an eye not directed at it. It would not do to make the attempt unless success were certain; for his unshielded suit would heat in a minute or two to an unbearable temperature, and the only place in which it was possible either to remove or cool it was on board the ship. He finally decided, to his annoyance, that the watch would not slacken so long as the air lock of the ship remained open. It would be necessary to find some means to distract or—an unpleasant alternative for a civilized man—disable the opposition while Cunningham got aboard, locked the others out, and located a weapon or other factor which would put him in a position to give them orders. At that, he reflected, a weapon would scarcely be necessary; there was a perfectly good medium transmitter on board, if the men had not destroyed or discharged it, and he need merely call for help and keep the men outside until it arrived.

This, of course, presupposed some solution to the problem of getting aboard unaccompanied. He would, he decided, have to examine the ship more closely after sunset. He knew the vessel as well as his own home—he had spent more time on her than in any other home—and knew that there was no means of entry except through the two main locks forward of the control room, and the two smaller, emergency locks near the stern, one of which he had employed on his departure. All these could be dogged shut from within; and offhand he was unable to conceive a plan for forcing any of the normal entrances. The view ports were too small to admit a man in a spacesuit, even if the panes could be broken; and there was literally no other way into the ship so long as the hull remained intact. Malmeson would not have talked so glibly of welding them sufficiently well to stand flight, if any of the cracks incurred on the landing had been big enough to admit a human body—or even that of a respectably healthy garter snake.

Cunningham gave a mental shrug of the shoulders as these thoughts crossed his mind, and reiterated his decision to take a scouting sortie after dark. For the rest of the day he divided his attention between the working men and the equally busy life forms that scuttled here and there in front of his cave; and he would have been the first to admit that he found the latter more interesting.

He still hoped that one would approach the cave closely enough to permit a really good examination, but for a long time he remained unsatisfied. Once, one of the creatures came within a dozen yards and stood "on tiptoe"—rising more than a foot from the ground on its slender legs, while a pair of an-

tennae terminating in knobs the size of human eyeballs extended themselves several inches from the black carapace and waved slowly in all directions. Cunningham thought that the knobs probably did serve as eyes, though from his distance he could see only a featureless black sphere. The antennae eventually waved in his direction, and after a few seconds spent, apparently in assimilating the presence of the cave mouth, the creature settled back to its former low-swung carriage and scuttled away. Cunningham wondered if it had been frightened at his presence; but he felt reasonably sure that no eye adapted to Denebian daylight could see past the darkness of his threshold, and he had remained motionless while the creature was conducting its inspection. More probably it had some reason to fear caves, or merely darkness.

That it had reason to fear something was shown when another creature, also of crustacean aspect but considerably larger than those Cunningham had seen to date, ap-

peared from among the dunes and attacked one of the latter. The fight took place too far from the cave for Cunningham to make out many details, but the larger animal quickly overcame its victim. It then apparently dismembered the vanquished, and either devoured the softer flesh inside the black integument or sucked the body fluids from it. Then the carnivore disappeared again, presumably in search of new victims. It had scarcely gone when another being, designed along the lines of a centipede and fully forty feet in length, appeared on the scene with the graceful flowing motion of its terrestrial counterpart.

For a few moments the newcomer nosed around the remains of the carnivore's feast, and devoured the larger fragments. Then it appeared to look around as though for more, evidently saw the cave, and came rippling toward it, to Cunningham's pardonable alarm. He was totally unarmed, and while the centipede had just showed itself not to be above eating carrion, it looked quite able to kill its own food if necessary. It stopped, as the other investigator had, a dozen yards from the cave mouth; and like the other, elevated itself as though to get a better look. The baseball-sized black "eyes" seemed for several seconds to stare into Cunningham's nroe orthodox optcis; then, like its predecessor, and to the man's intense relief, it doubled back along its own length and glided swiftly out of sight. Cunningham again wondered whether it had detected his presence, or whether caves or darkness in general spelled danger to these odd life forms.

It suddenly occurred to him that, if the latter were not the case, there might be some traces of previous occupants of the cave; and he set about examining the place more closely, after a last glance which showed him the two men still at work jacking up the hull.

There was drifted dust even here, he discovered, particularly close to the walls and in the corners. The place was bright enough, owing to the light reflected from outside objects, to permit a good examination —shadows on airless worlds are not so black as many people believe— and almost at once Cunningham found marks in the dust that could easily have been made by some of the creatures he had seen. There were enough of them to suggest that the cave was a well-frequented neighborhood; and it began to look as though the animals were staying away now because of the man's presence.

Near the rear wall he found the empty integument that had once covered a four-jointed leg. It was light, and he saw that the flesh had either been eaten or decayed out, though it seemed odd to think of decay in an airless environment suffering such extremes of temperature—though the cave was less subject to this affect than the outer world. Cunningham wondered whether the leg had been carried in by its rightful owner, or as a separate item on the menu of something

else. If the former, there might be more relics about.

There were. A few minutes' excavation in the deeper layers of dust produced the complete exoskeleton of one of the smaller crablike creatures; and Cunningham carried the remains over to the cave mouth, so as to examine them and watch the ship at the same time.

The knobs he had taken for eyes were his first concern. A close examination of their surfaces revealed nothing, so he carefully tried to detach one from its stem. It finally cracked raggedly away, and proved, as he had expected, to be hollow. There was no trace of a retina inside, but there was no flesh in any of the other pieces of shell, so that proved nothing. As a sudden thought struck him, Cunningham held the front part of the delicate black bit of shell in front of his eyes; and sure enough, when he looked in the direction of the brightly gleaming hull of the spaceship, a spark of light showed through an almost microscopic hole. The sphere *was* an eye, constructed on the pinhole principle—quite an adequate design on a world furnished with such an overwhelming luminary. It would be useless at night, of course, but so would most other visual organs here; and Cunningham was once again faced with the problem of how any of the creatures had detected his presence in the cave—his original belief, that no eye adjusted to meet Deneb's glare could look into its relatively total darkness, seemed to be sound.

He pondered the question, as he examined the rest of the skeleton in a half-hearted fashion. Sight seemed to be out, as a result of his examination; smell and hearing were ruled out by the lack of atmosphere; taste and touch could not even be considered under the circumstances. He hated to fall back on such a time-honored refuge for ignorance as "extrasensory perception", but he was unable to see any way around it.

It may seem unbelievable that a man in the position Laird Cunningham occupied could let his mind become so utterly absorbed in a problem unconnected with his personal survival. Such individuals do exist, however; most people know someone who has shown some trace of such a trait; and Cunningham was a well-developed example. He had a single-track mind, and had intentionally shelved his personal problem for the moment.

His musings were interrupted, before he finished dissecting his specimen, by the appearance of one of the carnivorous creatures at what appeared to constitute a marked distance—a dozen yards from his cave mouth, where it rose up on the ends of its thin legs and goggled around at the landscape. Cunningham, half in humor and half in honest curiosity, tossed one of the dismembered legs from the skeleton in his hands at the creature. It obviously saw the flying limb; but it made no effort to pursue or devour it. Instead, it turned its eyes in Cunningham's direction, and proceeded with great haste to put one

of the drifts between it and what it evidently considered a dangerous neighborhood.

It seemed to have no memory to speak of, however; for a minute or two later Cunningham saw it creep into view again, stalking one of the smaller creatures which still swarmed everywhere, nibbling at the plants. He was able to get a better view of the fight and the feast that followed than on the previous occasion, for they took place much nearer to his position; but this time there was a rather different ending. The giant centipede, or another of its kind, appeared on the scene while the carnivore was still at its meal, and came flowing at a truly surprising rate over the dunes to fall on victor and vanquished alike. The former had no inkling of its approach until much too late; and both black bodies disappeared into the maw of the creature Cunningham had hoped was merely a scavenger.

What made the whole episode of interest to the man was the fact that in its charge, the centipede loped unheeding almost directly through a group of the plant-eaters; and these, by common consent, broke and ran at top speed directly toward the cave. At first he thought they would swerve aside when they saw what lay ahead; but evidently he was the lesser of two evils, for they scuttled past and even over him as he lay in the cave mouth, and began to bury themselves in the deepest dust they could find. Cunningham watched with pleasure, as an excellent group of specimens thus collected themselves for his convenience.

As the last of them disappeared under the dust, he turned back to the scene outside. The centipede was just finishing its meal. This time, instead of immediately wandering out of sight, it oozed quickly to the top of one of the larger dunes, in full sight of the cave, and deposited its length in the form of a watch spring, with the head resting above the coils. Cunningham realized that it was able, in this position, to look in nearly all directions and, owing to the height of its position, to a considerable distance.

With the centipede apparently settled for a time, and the men still working in full view, Cunningham determined to inspect one of his specimens. Going to the nearest wall, he bent down and groped cautiously in the dust. He encountered a subject almost at once, and dragged a squirming black crab into the light. He found that if he held it upside down on one hand, none of its legs could get a purchase on anything; and he was able to examine the underparts in detail in spite of the wildly thrashing limbs. The jaws, now opening and closing futilely on a vacuum, were equipped with a set of crushers that suggested curious things about the plants on which it fed; they looked capable of flattening the metal finger of Cunningham's spacesuit, and he kept his hand well out of their reach.

He became curious as to the internal mechanism that permitted it

to exist without air, and was faced with the problem of killing the thing without doing it too much mechanical damage. It was obviously able to survive a good many hours without the direct radiation of Deneb, which was the most obvious source of energy, although its body temperature was high enough to be causing the man some discomfort through the glove of his suit; so "drowning" in darkness was impractical. There might, however, be some part of its body on which a blow would either stun or kill it; and he looked around for a suitable weapon.

There were several deep cracks in the stone at the cave mouth, caused presumably by thermal expansion and contraction; and with a little effort he was able to break loose a pointed, fairly heavy fragment. With this in his right hand, he laid the creature on its back on the ground, and hoped it had something corresponding to a solar plexus.

It was too quick for him. The legs, which had been unable to reach his hand when it was in the center of the creature's carapace, proved supple enough to get a purchase on the ground; and before he could strike, it was right side up and departing with a haste that put to shame its previous efforts to escape from the centipede.

Cunningham shrugged, and dug out another specimen. This time he held it in his hand while he drove the point of his rock against its plastron. There was no apparent effect; he had not dared to strike too hard, for fear of crushing the shell. He struck several more times, with identical results and increasing impatience; and at last there occurred the result he had feared. The black armor gave way, and the point penetrated deeply enough to insure the damage of most of the interior organs. The legs gave a final twitch or two, and ceased moving, and Cunningham gave an exclamation of annoyance.

On hope, he removed the broken bits of shell, for a moment looked in surprise at the liquid which seemed to have filled the body cavities. It was silvery, even metallic in color; it might have been mercury, except that it wet the organs bathed in it and was probably at a temperature above the boiling point of that metal. Cunningham had just grasped this fact when he was violently bowled over, and the dead creature snatched from his grasp. He made a complete somersault, bringing up against the rear wall of the cave; and as he came upright he saw to his horror that the assailant was none other than the giant centipede.

It was disposing with great thoroughness of his specimen, leaving at last only a few fragments of shell that had formed the extreme tips of the legs; and as the last of these fell to the ground, it raised the fore part of its body from the ground, as the man had seen it do before, and turned the invisible pinpoints of its pupils on the space-suited human figure.

Cunningham drew a deep breath,

and took a firm hold of his pointed rock, though he had little hope of overcoming the creature. The jaws he had just seen at work had seemed even more efficient than those of the plant-eater, and they were large enough to take in a human leg.

For perhaps five seconds both beings faced each other without motion; then, to the man's inexpressible relief, the centipede reached the same conclusion to which its previous examination of humanity had led it, and departed in evident haste. This time it did not remain in sight, but was still moving rapidly when it reached the limit of Cunningham's vision.

The naturalist returned somewhat shakily to the cave mouth, seated himself where he could watch his ship, and began to ponder deeply. A number of points seemed interesting on first thought, and on further cerebration became positively fascinating. The centipede had not seen, or at least had not pursued, the plant-eater that had escaped from Cunningham and run from the cave. Looking back, he realized that the only times he had seen the creature attack was after "blood" had been already shed —twice by one of the carnivorous animals, the third time by Cunningham himself. It had apparently made no difference where the victims had been—two in full sunlight, one in the darkness of the cave. More proof, if any were needed, that the creatures could see in both grades of illumination. It was not strictly a carrion eater, however; Cunningham remembered that carnivore that had accompanied its victim into the centipede's jaws. It was obviously capable of overcoming the man, but had twice retreated precipitately when it had excellent opportunities to attack him. What was it, then, that drew the creature to scenes of combat and bloodshed, but frightened it away from a man; that frightened, indeed, all of these creatures?

On any planet that had a respectable atmosphere, Cunningham would have taken one answer for granted—scent. In his mind, however, organs of smell were associated with breathing apparatus, which these creatures obviously lacked.

Don't ask why he took so long. You may think that the terrific adaptability evidenced by those strange eyes would be clue enough: or perhaps you may be in a mood to excuse him. Columbus probably excused those of his friends who failed to solve the egg problem.

Of course, he got it at last, and was properly annoyed with himself for taking so long about it. An eye, to us, is an organ for forming images of the source of such radiation as may fall on it; and a nose is a gadget that tells its owner of the presence of molecules. He needs his imagination to picture the source of the latter. But what would you call an organ that forms a picture of the source of smell?

For that was just what those "eyes" did. In the nearly perfect vacuum of this little world's sur-

face, gases diffused at high speed —and their molecules traveled in practically straight lines. There was nothing wrong with the idea of a pinhole camera eye, whose retina was composed of olfactory nerve endings rather than the rods and cones of photosensitive organs.

That seemed to account for everything. Of course the creatures were indifferent to the amount of light reflected from the object they examined. The glare of the open spaces under Deneb's rays, and the relative blackness of a cave, were all one to them—provided something were diffusing molecules in the neighborhood. And what doesn't? Every substance, solid or liquid, has its vapor pressure; under Deneb's rays even some rather unlikely materials probably evaporated enough to affect the organs of these life forms—metals, particularly. The life fluid of the creatures was obviously metal—probably lead, tin, bismuth, or some similar metals, or still more probably, several of them in a mixture that carried the substances vital to the life of their body cells. Probably much of the make-up of those cells was in the form of colloidal metals.

But that was the business of the biochemists. Cunningham amused himself for a time by imagining the analogy between smell and color which must exist here; light gases, such as oxygen and nitrogen, must be rare, and the tiny quantities that leaked from his suit would be absolutely new to the creatures that intercepted them. He must have affected their nervous systems the way fire did those of terrestrial wild animals. No wonder even the centipede had thought discretion the better part of valor!

With his less essential problem solved for the nonce, Cunningham turned his attention to that of his own survival; and he had not pondered many moments when he realized that this, as well, might be solved. He began slowly to smile, as the discrete fragments of an idea began to sort themselves out and fit properly together in his mind—an idea that involved the vapor pressure of metallic blood, the leaking qualities of the utility suits worn by his erstwhile assistants, and the bloodthirstiness of his many-legged acquaintances of the day; and he had few doubts about any of those qualities. The plan became complete, to his satisfaction; and with a smile on his face, he settled himself to watch until sunset.

Deneb had already crossed a considerable arc of the sky. Cunningham did not know just how long he had, as he lacked a watch; and it was soon borne in on him that time passes much more slowly when there is nothing to occupy it. As the afternoon drew on, he was forced away from the cave mouth; for the descending star was beginning to shine in. Just before sunset, he was crowded against one side; for Deneb's fierce rays shone straight through the entrance and onto the opposite wall, leaving very little space not directly illuminated. Cunningham drew a sigh of relief for more reasons than one when the

upper limb of the deadly luminary finally disappeared.

His specimens had long since recovered from their fright, and left the cavern; he had not tried to stop them. Now, however, he emerged from the low entryway and went directly to the nearest dust dune, which was barely visible in the starlight. A few moment's search was rewarded with one of the squirming plant-eaters, which he carried back into the shelter; then, illuminating the scene carefully with the small torch that was clipped to the waist of his suit, he made a fair-sized pile of dust, gouged a long groove in the top with his toe, with the aid of the same stone he had used before, he killed the plant-eater and poured its "blood" into the dust mold.

The fluid was metallic, all right; it cooled quickly, and in two or three minutes Cunningham had a silvery rod about as thick as a pencil and five or six inches long. He had been a little worried about the centipede at first; but the creature was either not in line to "see" into the cave, or had dug in for the night like its victims.

Cunningham took the rod, which was about as pliable as a strip of solder of the same dimensions, and, extinguishing the torch, made his way in a series of short, careful leaps to the stranded spaceship. There was no sign of the men, and they had taken their welding equip-

ment inside with them—that is, if they had ever had it out; Cunningham had not been able to watch them for the last hour of daylight. The hull was still jacked up, however; and the naturalist eased himself under it and began to examine the damage, once more using the torch. It was about as he had deduced from the conversation of the men; and with a smile, he took the little metal stick and went to work. He was busy for some time under the hull, and once he emerged, found another plant-eater, and went back underneath. After he had finished, he walked once around the ship, checking each of the air locks and finding them sealed, as he had expected.

He showed neither surprise nor disappointment at this; and without further ceremony he made his way back to the cave, which he had a little trouble finding in the starlight. He made a large pile of the dust, for insulation rather than bedding, lay down on it, and tried to sleep. He had very little success, as he might have expected.

Night, in consequence, seemed unbearably long; and he almost regretted his star study of the previous darkness, for now he was able to see that sunrise was still distant, rather than bolster his morale with the hope that Deneb would be in the sky the next time he opened his eyes. The time finally came, however, when the hilltops across the valley leaped one by one into brilliance as the sunlight caught them; and Cunningham rose and stretched himself. He was stiff and cramped, for a spacesuit makes a poor sleeping costume even on a better bed than a stone floor.

As the light reached the spaceship and turned it into a blazing silvery spindle, the air lock opened. Cunningham had been sure that the men were in a hurry to finish their task, and were probably awaiting the sun almost as eagerly as he in order to work efficiently; he had planned on this basis.

Malmeson was the first to leap to the ground, judging by their conversation, which came clearly through Cunningham's phones. He turned back, and his companion handed down to him the bulky diode welder and a stack of filler rods. Then both men made their way forward to the dent where they were to work. Apparently they failed to notice the bits of loose metal lying on the scene—perhaps they had done some filing themselves the day before. At any rate, there was no mention of it as Malmeson lay down and slid under the hull, and the other began handing equipment in to him.

Plant-eaters were beginning to struggle out of their dust beds as the connections were completed, and the torch started to flame. Cunningham nodded in pleasure as he noted this; things could scarcely have been timed better had the men been consciously co-operating. He actually emerged from the cave, keeping in the shadow of the hillock, to increase his field of view; but for several minutes nothing but plant-eaters could be seen moving.

He was beginning to fear that his invited guests were too distant to receive their call, when his eye caught a glimpse of a long, black body slipping silently over the dunes toward the ship. He smiled in satisfaction; and then his eyebrows suddenly rose as he saw a second snaky form following the tracks of the first.

He looked quickly across his full field of view, and was rewarded by the sight of four more of the monsters—all heading at breakneck speed straight for the spaceship. The beacon he had lighted had reached more eyes than he had expected. He was sure that the men were armed, and had never intended that they actually be overcome by the creatures; he had counted on a temporary distraction that would let him reach the air lock unopposed.

He stood up, and braced himself for the dash, as Malmeson's helper saw the first of the charging centipedes and called the welder from his work. Malmeson barely had time to gain his feet when the first pair of attackers reached them; and at the same instant Cunningham emerged into the sunlight, putting every ounce of his strength into the leaps that were carrying him toward the only shelter that now existed for him.

He could feel the ardor of Deneb's rays the instant they struck him; and before he had covered a third of the distance the back of his suit was painfully hot. Things were hot for his ex-crew as well; fully ten of the black monsters had reacted to the burst of—to them—overpoweringly attractive odor—or gorgeous color?—that had resulted when Malmeson had turned his welder on the metal where Cunningham had applied the frozen blood of their natural prey; and more of the same substance was now vaporizing under Deneb's influence as Malmeson, who had been lying in fragments of it stood fighting off the attackers. He had a flame pistol, but it was slow to take effect on creatures whose very blood was molten metal; and his companion, wielding the diode unit on those who got too close, was no better off. They were practically swamped under wriggling bodies as they worked their way toward the

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air lock; and neither man saw Cunningham as, staggering even under the feeble gravity that was present, and fumbling with eye shield misted with sweat, he reached the same goal and disappeared within.

Being a humane person, he left the outer door open; but he closed and dogged the inner one before proceeding with a more even step to the control room. Here he unhurriedly removed his spacesuit, stopping only to open the switch of the power socket that was feeding the diode unit as he heard the outer lock door close. The flame pistol would make no impression on the alloy of the hull, and he felt no qualms about the security of the inner door. The men were safe, from every point of view.

With the welder removed from the list of active menaces, he finished removing his suit, turned to the medium transmitter, and coolly broadcast a call for help and his position in space. Then he turned on a radio transmitter, so that the rescuers could find him on the planet; and only then did he contact the prisoners on the small set that was tuned to the suit radios, and tell them what he had done.

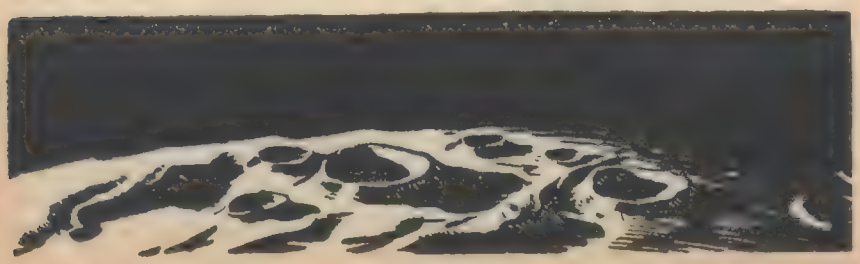
"I didn't mean to do you any harm," Malmeson's voice came back. "I just wanted the ship. I know you paid us pretty good, but when I thought of the money that could be made on some of those worlds if we looked for something besides crazy animals and plants, I couldn't help myself. You can let us out now; I swear we won't try anything more—the ship won't fly, and you say a Guard flyer is on the way. How about that?"

"I'm sorry you don't like my hobby," said Cunningham. "I find it entertaining; and there have been times when it was even useful, though I won't hurt your feelings by telling you about the last one. I think I shall feel happier if the two of you stay right there in the air lock; the rescue ship should be here before many hours, and you're fools if you haven't food and water in your suits."

"I guess you win, in that case," said Malmeson.

"I think so, too," replied Cunningham, and switched off.

THE END.



The Infidels

by

ROSS ROCKLYNNE

At times a savage tribe's pagan beliefs can be decidedly troublesome. Then you have your choice of a military expedition or—a specialized sort of philosopher who can make those beliefs highly uncomfortable for the believers.

Illustrated by Kramer

Kane's broad, sweating face was brick-red with wrath as the bi-monthly supply ship lifted itself on huffing jets of gravitonic flame, cleared the tops of the jungle, then disappeared two shakes faster than the eye could follow. Confounded bunch of incompetents, that Interstellar Advisory Board!

He shouldered his way through two lines of fuzzy-blond natives, who with the docility of their race were rushing the cases of supplies into Kane's *cree,* returning as swiftly for another load. He bore down on the bespectacled, scared-looking person that supply ship had left behind. He grabbed the limp, wet hand, said in a voice charged with irritation.

"My name's Kane—Ron Kane; and I'm plenty glad to see another white man! Stinking hole, this, and no place for anybody that values himself. But plainly, can you tell me why in the name of the forty-eleven habitable solar systems the Advisory Board didn't see fit to honor my request for a landing of military troops?"

"Military troops?"

"That's what I said!" roared Kane, livid. "The planet needs to be taken in hand. The people are a conglomeration of stupidity and religious fanaticism. Why"— Kane pointed a thick quivering hand at the doorless *fenigan* in the middle of the crude mud village—"how long do you think Hubbard can hold out, all alone in there without a scrap of food or a drop of water?"

The bespectacled person—and it was his eyes alone which revealed any vitality, belying the consumptive, stringy appearance of his body—turned to look at the *fenigan*.

"Ah?" he said uncertainly. "That's where they've been keeping your friend."

"That's where they've been keeping him!" Kane snarled, not liking the mildness of this. "Starving him, get that? I'm helpless. Oh, yes, I've been getting food to him, but how long d'you suppose it'll be before they've found the tunnel I blasted from my *cree?*" He went trailing off into a string of expletives.

"So," he finished, "I want to know why they've let me down!"

The pinched red face, jeweled with sweat that reflected the overhead Sol-type star of this planetary system, turned vaguely toward him. "I'm sure nobody let you down, Mr. Kane. I'm here to clear up your troubles."

"You are! This is too much!"

Kane was laughing, bursting with it, racked with it—every irritation of the past week packed into that sound.

"Mr. Kane," the voice was, to make matters funnier, frosty, insulting, "if you'll read the letter of introduction the captain of the supply ship handed you, I'm sure you'll see why a landing of military troops is unnecessary."

Kane lifted his *kepi* from his big strongly shaped head, smoothed down sweat-sodden straight black hair, and slapped the *kepi* back into place again, at a rakish, cockeyed angle. "Man, that'll take some proving!"

But he ripped the legal-size envelope from his rotting yellow leather jacket. His short blunt fingers, bleached white by the humidity, ripped the envelope, smoothed out the sheet inclosed. He read:

Dear Mr. Kane:

The trouble you mention in connection with the planet Konara is not uncommon on other planets. The solution lies not in military occupation and a forceful shaping of the natives' beliefs as you seem to think, but in an approach which we have discovered to be, while more subtle, of incalculably greater benefits to the human race as well as to the natives in question. While it is our plain purpose commercially to exploit the natural resources of a planet, we would rather abandon a planet than use any sort of compulsion on its inhabitants.

This letter introduces Quentin Johanigman, one of our most trusted troubleshooters. In the parlance of his trade, he is known as a "religion-buster." With his help we are certain your trouble on Konara will disappear.

As per your request, only vegetables and meat-substitutes have been included in your supplies.

Kindest regards,
Interstellar Advisory Council.

"Religion-buster, eh?" said Kane, glaring at Johanigman.

"Er . . . yes," Johanigman muttered, turning his attention away from the working natives. The scene was on one hand busy, on the other indolent. Beyond the natives carrying cases of canned goods, the hard-packed red earth avenue running between the two long rows of Konara *crees* lay spread out, with children playing in puddles where the morning rains had collected; with oldsters sprawled sleeping, with women, old and young, slowly working their *faja* grinders for the making of flour, their blond fairy-hair waving in humid jungle breezes.

These Konaras had the human aspect as did so many races throughout the universe. Internally there were a few differences which kept them from falling into the *homo sapiens* classification.

Johanigman jerked his attention from them. He said, "Perhaps we can discuss all this in the privacy of your *cree,* Mr. Kane. Principally, I want to get a picture of the religion of these people. As the letter says—that's what I am, a religion-buster."

"All right," agreed Kane. He whirled, as one of the Konara stumbled. *"Friu!"* Kane roared, jumping toward the fellow, massive right arm raised in a threatening striking position over his left shoulder. *"Friu-nozte lermiu pyo!"*

The native bowed and scraped and grinned broadly so that his back molars showed and went guiltily away, lugging the cases of canned goods.

"Stupid, submissive, humble, gutless children of the jungle!" Kane raved, pacing the board floor of his *cree,* flinging about with his arms. "Anyway, Johanigman, that's the picture. Religious fanatics. Religion is *nun-nunkhav*—the practice of kindness, equality with life, live and let live, you eat me but I don't eat you, if you want a few loose translations."

"Vegetarians," Johanigman said, puffing in peculiar asthmatic wheezes on a moisture-saturated cigarette.

"Sure they're vegetarian. But not on the basis of what's healthy and what isn't it. They don't drink animal milk, because it takes away milk from the animal young. They don't wear leather trimmings because leather is the skin of an animal. They don't eat meat, because they wouldn't kill any sentient thing."

Johanigman coughed rackingly on the smoke. *"Any* sentient thing?"

Kane said, his broad face showing a sweaty disgust: "It's a sin against *nun-nunkhav* to use other sentient life in any way to further themselves. Listen!"

A peculiar *clomp-kta-clomp* sounded like thunder from the village street. A second later there was a shrill screaming, quavering cry.

"A *mord!*" Kane cried, galvanized. He swept to the door, thrust the curtains aside. "Come here, Johanigman!" he cried with a vicious excitement. "You'll see what I mean!"

The *clomp-kta-clomp* seemed to be shaking heaven as well as Earth. Johanigman stood beside Kane, as the long, six-legged, striped, horse-headed beast came thundering into the village from the jungle. It screamed as it ran. Its neck stretched serpentine-fashion six body-lengths from the ground.

Konaras completely failed to show any alarm. They kept on working. Children played in the mud puddles in the middle of the street, oblivious. Johanigman tensed as the beast thundered toward them.

"Don't worry!" Kane said savagely. "It won't hurt *them!*"

The *mord* didn't hurt anybody. Its ludicrously wild-stepping feet detoured everybody. But when it got to the first *cree,* its head came down and with a loud eager trumpeting sound it turned the *cree* over and it rolled away. The *mord* tore the stuffed fibrous bags in the *cree* to pieces, and Johanigman heard a powerful sucking sound as the beast drew hundreds of pounds of *faja* flour into his stomach. Then the *mord* gave a great scream and *clomp-kta-clomped* whizzingly back into the humid, lowering jungle whence it came.

The Konaras to whom the *cree* and *faja* flour belonged gathered round and laughing and chattering among themselves pushed the *cree* back into position. Meanwhile, everybody went on doing exactly what he had been doing all the while.

"You see?" Kane roared with laughter, slapping his great meaty thigh. "They're fools, every blessed one. Live and let live. And that isn't the worst of it. Birds ruin their *faja* fields, the only thing they cultivate. Half their crops go flying away in a few thousand gullets. They never have enough to eat. They go into the jungle and collect nuts, berries, wild roots and fruits and the meat-eaters of the jungle kill them off ten to a hundred every year. And they won't fight back.

"And this isn't the only village. It's that way over the whole planet. Religion! *Nun-nunkhav!* Go ahead and bust *that,* my friend!"

Johanigman sat down, knees crossed tightly, his narrow shoulders hunched together, his pinched white face reddening under Kane's open contempt.

"Well," he said at last, "I guess I will. I'll have to. This planet isn't any good for anybody until we bust *nun-nunkhav.*" He licked his nervous lips, said hesitantly, "You see, Mr. Kane, it's been proved over and over again, that man can't exploit a planet properly until the population can be molded into a co-operating unit. Human beings are essentially meat-eaters. When human beings come to this planet, they're not only going to have to kill sentient life for food, but to clear the menace of the great meat-eaters from the jungle. Can't do that unless we have the permission and co-operation of the natives. And they won't co-operate unless they no longer believe in *nun-nunkhav.*"

Kane made a snorting sound.

Then with a great striding movement, he went to the corner of the hut, shoved dirt away from the floor in mighty scraping motions, and swung up a metal hinge.

Kane kneeled, called softly into the dark cavity revealed,

"Hubbard!"

After a moment, a muted, weary voice drifted back: "O.K."

There were sliding, crawling sounds. Presently a dirty, thin blond head stuck itself over the edge of the opening. The gaunt naked torso emerged and Hubbard leaned on the edge of the cavity in a position of weary ease.

"Time to eat again?" he asked, rolling his eyes hopefully at Kane.

Kane whirled, snatched a can of sliced peaches from a shelf. He thrust it into Hubbard's hand after cutting it open.

"Here! But my heaven, I can't give you a drop more. Look at you! What d'you think the Konaras think of you—living for a week without food, supposedly, and still living? This evening when they poke their heads in to look you over, you better lay down in the corner and moan and stick those ribs out a little more!"

Hubbard grinned wryly, turned pale-blue eyes to Johanigman. He said, "Kane is an excitable beast. He wonders what's going to happen when they discover he's been feeding me through the underground."

"Hubbard," said Kane, "this is Quentin Johanigman—a religion-buster." He explained more fully. "Now! Go ahead and explain what he's up against—but be ready to duck back to the *fenigan* if any of those snoopy Konaras show up."

Hubbard grinned again. "I've heard of you religion-busters," he told Johanigman. "Matter of fact, I've heard of you. Always busting up these fussy religions that halt the conquest by man. Well, *nun-nunkhav* needs busting, brother." He started eating the peaches, swallowed and went on:

"See, I came here last month; ten thousand bucks a year. Kane was here before me. We're the advance guard—casing the joint, see? Then we report to the Advisory Board and they take whatever steps are necessary to make it possible for more men to come. Say that we get a deadly disease and kick the bucket—well, that's valuable information and they isolate the bug and send a couple other suckers to take our places.

"Well, that ain't important. What is important is that I crave juicy lean steaks, so one day I killed a *kibber* bird. I was all ready to stick it in the kettle when along come these Konaras and gently put me in the *fenigan*—jail to you. Seems I had committed the worst crime possible. Killing life. So that's it."

Johanigman said cautiously, "But by starving you, they kill life themselves."

"Ah! That's where you're wrong," said Hubbard gayly. "All they do is put me in the *fenigan*. If the gods don't see fit to feed me by some method of celestial injection, that's too bad. I die, and the

Konaras aren't to blame."

He paused. His thin, whimsical face hardened. He said angrily, "What I want to know is why they didn't bring a few marines to hustle me out of the *fenigan* and take me to safety!"

Johnanigman was pulling a battered notebook from his inner pocket. He said guiltily, "Well, they feel the Konaras would be hopelessly antagonized by such a procedure."

"The Konara!" Hubbard screeched, glaring. "I want to live!"

Johanigman said, peering nearsightedly at his booklet, "I've handled a few cases vaguely similar to this. Now, Mr. Kane, we may as well get to work right away. You say the Konaras are submissive. That means they'll listen to reason."

Kane whooped with laughter and called upon a higher being to witness this insanity. "Reason!" he said at last, amazed. "Johanigman, understand this. The religion called *nun-nunkhav* is rooted in tradition. It's thousands of years old. It's planet-wide in practice. And you're going to *reason* with them!"

Johanigman reddened again. He said doggedly, "Mr. Kane, I want you to call an audience of all the Konara chiefs in this neighborhood."

"What for?" shouted Kane, annoyed.

"Mr. Kane." There was that prim stiffening again. "Please be assured that I *may* know what I'm doing! In the first place, I haven't fooled around with religion-busting for a good many years without being able to spot character-types. These savages in some respects fall into a mold. They may be religious fanatics, but I am perfectly willing to lay you a little side bet that their morals aren't so rigid that they couldn't be . . . sneaky . . . well, dishonest . . . on occasion. Right?"

Hubbard, finishing up the peaches, uttered a sharp barking laugh and grinned with enjoyment at Kane. "He's got you!" he said to Johanigman, "Sneaky is the best word. Don't go euphemistic on us. They take all the kicking around they deserve, but under that pious mask lies a calculating mind. They confiscated all my possessions when they gently herded me into the *fenigan* last week. Maybe that was the real reason they got mad at me?" He arched a humorous blond eyebrow.

"Maybe!" snapped Kane, tossing his head. "I'll concede the point. They snoop and they sneak. I wouldn't say they're above stealing. What's that got to do with it?"

Johanigman didn't answer the question. "Second," he said, snapping one index finger against the other, "there's the important fact that they're religious fanatics. Ever run across a religious fanatic who didn't try to proselytize anybody he contacted? Same with these Konaras. They'd do backward handsprings if they thought they could convert anybody to their religion.

"Watch me, Mr. Kane. I'll have them doing backward handsprings

—into some holes they won't know are there."

"So I call a meeting of chieftains," Kane said cynically.

"Yes. Simply tell them I am a representative from the Lord of the Planets, the All-Watching Father or some such nonsense. I presume they have a certain amount of awe for a person who steps out of a spaceship anyway. Explain to them that I wish to have *nun-nunkhav* interpreted properly so that it might be spread to other peoples in other parts of the Galaxy."

Hubbard grinned wryly and looked at Kane. He jerked his head at the "religion-buster." "Smart, eh? Using the psychological approach!"

Kane was a monument of explosive energy. Thirty-three hours later, when the Sol-type star was directly overhead, he and Johanigman were walking down the village street toward the long house where fourteen Konara chieftains were awaiting a discussion of *nun-nunkhav*. Moreover, Kane had decided grudgingly, they were eager for the discussion.

A *mord* had just made his daily visit. Three *kibber* birds were having a field day with a few tons of nuts laying out to dry. Nobody was shooing away the *kibber* birds.

Two piglike animals were moving at breakneck speed into *cree* after *cree*, emerging licking their scaled chops.

Kane and Johanigman were shown into the long house. Kane introduced Johanigman all around, and each fuzzy, blond-headed chieftain rose gravely, acknowledging the introduction in the universal language. They were watching Johanigman with suppressed excitement.

Johanigman rose. He appeared ill at ease. He said briefly, "Konara chiefs, the religion of your planet has met the great approval of my chief. I will now ask you to explain *nun-nunkhav* more fully. Speak."

One by one chieftains spoke, Trio, head man of this village, leading off.

"We seek to escape the suffering of life. But in seeking to escape suffering, why should we inflict it on others? The thought of brutal killing and unkindness is abhorrent."

"Killing is the gratification of the pride of egoism."

"A right control of mind will enable us to keep the precept of kindness to all animate life."

"Unless we have wholly annihilated all tendency to unkindness toward others, we will ultimately fall into the realm where the Evil Ghosts dwell. There are three ranks of these Ghosts: the highest are the mighty Pishin Ghosts, the next are the Umri Ghosts who fly through the air, and the lowest are the By-by Ghosts that live under the earth. These different Ghosts will be encountered everywhere deceiving people and teaching them that they can still kill animate life and yet attain enlightenment."

"How can any follower of *nun-nunkhav* kill sentient life and eat flesh?"

"If one is trying to practice *nun-nunkhav* and is still killing any sentient life, he is like a man closing his ears then shouting loudly and asserting that he heard nothing."

"Pure and earnest believers will not wear clothing of silk nor foot-gear of leather, because it involves the taking of life. Neither will they drink milk or eat its products, for thereby they are depriving the young animals of that which rightfully belongs to them."

There was more. Watching Johanigman cynically, Kane thought that this was about as far as Johanigman would progress. He had had fanaticism explained to him —what could he do with it?

Johanigman touched his lips with his tongue. "The religion of *nun-nunkhav* is indeed great," he said haltingly. "One of our prophets, Moses, himself forbade the killing and eating of the hog, for it carries

a deadly parasite in its flesh. How he might have progressed had he had available the teachings of *nun-nunkhav!"*

A murmur of gratification rose from the chiefs.

Johanigman continued, as if he were puzzled, "And yet, great chiefs, though I know you to be sincere, can it be true that you are all sincere, truly sincere, believers?"

Kane suppressed a gasp. One chief started excitedly to his feet, but Johanigman said hurriedly,

"Great chiefs, when I teach what I have learned to my people, I shall tell them to examine each square inch of ground before they set foot to it. In this way, they shall refrain from killing insect life. Do the great chiefs I speak to examine the place of their next step thus?"

The chief who was standing slowly closed his mouth. He looked uneasily at his fellows.

"This minute examination is not part of our teachings, friend from the stars."

Johanigman's intense eyes burned on chief after chief. "I had thought all of you to be believers. My converts, great chief, shall then be more perfect believers of *nun-nunkhav."* He spoke with determination. "To kill is wicked. Therefore their progress through life shall be slow, as they examine the ground before them. I thank you, great chiefs, for your help."

Johanigman left the table, moving with his chin up, and departed from the long house. He appeared mortally hurt.

There was immediately an excited commotion. Chiefs leaped up, babbling with many gestures in their own language. They conferred. Finally one approached Kane, with many grins and bowings and scrapings.

"O man of Earth," this one stated, "there are no greater believers of *nun-nunkhav* than we. How can we allow *scodder* Johanigman to carry to the other worlds the news that we, the Konaras, are capable of a weaker belief than they? Will you inform the *scodder* that word will now go out to the peoples of our planet that they are to observe the ground they walk upon, so that they kill no life?"

Kane was dazed. "I will be glad to inform Johanigman of your pure belief," he said at last.

They appeared relieved. At once the chief of this village, with great excitement, spoke, commandingly. Twelve great chiefs dropped to hands and knees, searching for insects. Kane left them, shaking his great head with a volcanic puzzlement.

He found Johanigman in the *cree* that had been set aside for him.

Johanigman shrugged, busily making notes. "A simple, childish mind needs the provision of childish motives. The first step toward the voiding of *nun-nunkhav* has been accomplished."

"The first step!" shouted Kane. "Why, man, *nun-nunkhav* has simply taken firmer root. They're already so envious of your future 'converts' that they'll do anything to outstrip them."

"Precisely. And it will drive

them crazy. How long before the new ruling regarding *nun-nunkhav* will spread over the planet?"

"With their signal and runner system, three-four days. The planet's only a thousand miles in diameter."

Johanigman gnawed on a pencil. "And Hubbard will manage to remain alive, we'll presume. Of course, you can't fatten him up too much. Isn't it possible they'll believe he's being fed from a celestial source?"

Kane dropped onto Johanigman's bunk, stretching out his long legs, jamming his big hands into the pockets of his whipcords. He said grimly, "They won't believe the gods are taking a hand until they check every possible human source. When they discover the tunnel, I go into the jug with Hubbard."

"A strange religion. It is certainly an unkindness to starve Hubbard."

"All they did was to put him in the *fenigan*. Too bad if he dies."

Johanigman looked unhappy. "Well, we'll just have to wait. Meantime, if any of the chiefs ask about me, tell them I'm staying in my *cree*, meditating on *nun-nunkhav*. Incidentally, to prepare the way, tell them that after thinking it over, it seems to me that *nun-nunkhav* is not practiced as closely as it might be. In other words, they're not real believers."

"Oh, man. Won't they love that."

If this little village was anything like the rest of the villages spread over the jungled surface of Konara, Johanigman was right, thought Kane: the Konaras were being driven crazy. Kane himself witnessed the daily job given the children of the village. At early morning, they crawled over every square inch of the village grounds, picking up insects and placing them tenderly in a paper bag. Thereafter the adults came out of their *crees* for the daily work.

Kane was bug-eyed. These Konaras moved slowly, eyes on the ground. Every time they took a step, they had a terrific case of nerves.

Kane went with a party of Konaras into the jungle on a fruit gathering expedition. He didn't mind *them* examining the ground ahead of them before they put their feet down—it was their insistence that he do the same thing that bothered him.

"Oh, nuts," said Kane, turning and picking his way step by step away from the party. As soon as he was out of sight, he didn't care how many insects he stepped on.

On the third day after this, the chief of the village approached Kane.

"We are very anxious that *scodder* Johanigman know we are now observing *nun-nunkhav* in its fullest particulars," he said. "The word has gone out to all villages and indeed we feel ourselves to be true believers."

"Look out, there!" said Kane maliciously.

The chief jumped, turned pale as he examined the spot where he

had carelessly placed his foot. He was relieved.

"It is most annoying—and wearying," he told Kane. "This new, heretofore unthought of interpretation of *nun-nunkhav*. But we are trying to be perfect in our belief, so that we may be good examples to those millions who will soon believe as we."

"Trying!" exploded Kane. "You can't try, you gotta *be* perfect. If you fellows can go around killing insects by stepping on them, my friend Hubbard had just as much reason to kill a *kibber* bird! And listen, chief. I'm not so sure *scodder* Johanigman hasn't found a few interpretations of *nun-nunkhav* that you fellows aren't living up to. Chances are, he'll take *nun-nunkhav* back to his people in an improved version."

The chief showed his distress. He moaned, "In thousands of years, it is strange we have not considered our unknowing cruelty to insect life."

"You didn't consider it because you knew it'd be a lot of bother," snapped Kane, cocking his hat flippantly on his head and striding away. He shot back over his shoulder, "But in a religion like this one, chief, you can't think one second of personal discomforts! Better get your chiefs together again. Johanigman wants to talk."

Seven chiefs showed up the next day. Johanigman, sweat dripping in clockwork drops from his nose, stood at the head of the table. "The Lord of the Planets is displeased," he said coldly. "I see but seven where there were twelve."

"They are weary," the spokesman said dolefully. "They could not bear the thought of a journey where each unheeded footstep brings death and misery to others."

"Then," said Johanigman, "they had best cease the practice of *nun-nunkhav!* However, it is not to berate you that I have come. I wish to become a believer myself, but first I am performing an experiment which will prove to me whether or not *nun-nunkhav* is a workable religion. Now on this table, I have a great eye which sees into the world of the small."

Kane thought with some astonishment, "An electron microscope, by heaven! I'm beginning to see some sense to this!"

Johanigman said sternly, "The believers of *nun-nunkhav* will be pleased to know that that which the eye of man shows is not all that is. Thus I open to you new vistas. There are animals too small for the naked eye."

The spokesman, a chieftain named Cavil, rose trembling to his feet. His face, normally fair in texture, had a greenish cast.

"I am ill," he said in a shaking voice. "This thing is not to be borne. What are you doing to us, O *scodder* Johanigman? Our every motion must be watched, lest we kill. Now are we to believe that even though we avoid the animals that we see, we are bound not to kill those we cannot see?"

Johanigman looked around on the assembled chiefs, each of whom

silently asked the same dreaded question.

"At present," he said coldly, "I do not know. But I do know this. If I am to become a believer, I must seek the truth, so that I may carry it to other peoples. Are you not believers in the truth?"

"The truth prevails," said Cavil hollowly.

"Then we shall discover the truth. I have here on a slide a few weights of the red earth which composes the village streets. I place it under the great eye, thus, which sees into the world of the small. Now I shall see if there is life beyond the eye of man."

Kane felt the nervous tension of those in the long house running through his own body.

Johanigman bent to the microscope, then thought better of it, raised his scraggly head.

"O Trio," he said, addressing himself to the chief of this village, "before we seek the truth, you must caution your peoples to remain motionless. For if there is a smaller life, who knows?—each step, each motion, each threshing of the *faja* flour may result in the death of countless small animals."

Trio feebly clapped his hands. A servant appeared. Trio spoke and the servant disappeared.

Trio said dully, "They are so cautioned."

Johanigman bent to the microscope, turned small screws. The Konaras leaned forward, staring, breath halted on their lips.

A shuddering sigh swept through them as Johanigman raised his head once more.

He said quietly, "There is life. There are lives by the million, beyond the eye of man. Trio, then Cavil, then the rest. You may view for yourselves. Come."

The Konaras sat frozen.

Finally from Cavil's twisted lips: "If we move—"

"Come," said Johanigman, irritably. "Is there a difference between smashing these helpless small creatures now and in the hour just past? A few more million deaths will be of no consequence. Come."

Kane gripped the edge of the table to keep himself from exploding with hysterical laughter. He was gasping inwardly as one by one they moved like sleepwalkers toward the electron microscope. One step, two steps, three. And three million or more poor little microbes dead. Or so they thought.

After they had returned to their seats, Johanigman said, his intense eyes sweeping them, "I shudder to think of the millions of Konaras who have violated *nun-nunkhav* in the hundreds of years past."

"We did not know," said Cavil, staring straight out in front of him, his voice a monotone.

"However," said Johanigman, "there is a bare chance that these creatures we see swarming are too small to be harmed by the weight of a Konara foot. I will require time to find out."

"If," said Cavil, still dully, "they are not too small—what then? Must we remain moveless until we die?"

Johanigman looked at Cavil until Cavil was forced to return the glance. "Cavil, you know the answer to that yourself. It must come from your own heart. Does not *nun-nunkhav* forbid the destruction of other sentient life, no matter what the personal discomfort?"

Cavil said, "We will remain moveless until your experiment is finished."

"Good."

Johanigman jerked his head toward Kane and together they left the long house.

The village was a picture of motionlessness. Konaras were sitting down wherever they had been when the command reached them.

"You're some guy, all right," Kane swore, looking at Johanigman in admiration. "It's better than hypnotism."

"Jujitsu is a better word. I'm merely pushing them in the direction they're heading—only faster."

"Got 'em right w h e r e you want 'em! But look here—how come they let *us* walk around, killing all those poor innocent little millions of microbes?"

Johanigman smiled through his abstraction as they entered Kane's *cree*, carrying the microscope. "Why not? I'm outside the pale, an arbiter, the only person who can save them. They're willing to blind themselves to anything if I can make *nun-nunkhav* practical."

"Practical? H a h. Seriously though, you know we don't harm a hair of those microbes' filthy thoraxes by stepping on 'em. How about that?"

Johanigman sat down, lighting one of his soaked cigarettes. He looked pleased with himself. Kane felt a flash of respect for the little man as he hoisted his thin legs to a resting position on Kane's desk.

Johanigman grinned and blew out smoke. "I'm beginning to feel better. That microbe business is a preliminary step. It puts them in a receptive state of mind for the next bitter blow. Also, it shows me just how far I can go." Johanigman's smile was beaming, rosy. He crooned foolishly, "We'll let 'em sit for awhile, then go in and say we've measured the size of said microbes and the little darlings can't be killed except by boiling water and such-like. Try one of these?"

"No, thanks. I've gotta pipe."

They smoked. Suddenly, Kane went to the tunnel and called for Hubbard. Hubbard came, shouted with laughter when Kane told him the story. He clapped his hand over his mouth. "Oof!" He looked toward the door. Then he crawled out of the tunnel and took a seat.

"A neat trick, Johanigman! What's the next step?"

Johanigman appeared embarrassed. Kane, thinking it over, knew he was the one that should feel that way. Never could tell a guy by his stripes. Johanigman was O.K. Johanigman didn't feel like discussing the next step, and they launched into a bull session. Johanigman held the floor most of the time. He had a lot to say about religion-busting.

After a couple hours of this, Johanigman rose.

"I'd better rescue the poor devils," he laughed. "Meantime, Hubbard, you better get back in the *fenigan.*"

Hubbard stayed around a couple minutes after Johanigman left.

"Is *he* a surprise! Say, you think he's really going to bust this religion? It's still a tough proposition." He thought over what he had said. His face turned wild. "Why, what am I talking about? He *has* to bust it, or we're both goners!"

His eyes strayed toward the food shelves. Kane, for all his rough exterior, reluctantly let him open a container of canned bread. Hubbard grinned, "Thanks. I better get back in my hole. Johanigman is in the long house by now and this village will be making up."

Kane heard a sound from the door of the *cree.* He blanched, was at the door in one powerful leap. Just as he thrust the curtains aside, a Konara went scuttling away. There was little doubt that he had been listening at the door.

The rest of the villagers were still sitting absolutely motionless. This Konara, then, had just come from the jungle.

Kane was rooted, caught in a trap that knew no solution. He turned dazedly back to Hubbard, but Hubbard was gone. Kane went to the tunnel, called bitterly, "Stay there, Hubbard. But I think the game's up. He heard us talking."

A couple of moments later, Kane heard a great burst of sound as the village, in response to the shouted command of a runner, woke up.

About five minutes later, Kane was sitting in his *cree,* puffing blackly on his pipe, when Trio, attended by several Konaras came into the hut. The Konaras began to search the hut. They found the tunnel-opening. Kane didn't resist.

Kane said suddenly, "I'm hungry!"

Hubbard's reply in the darkness of the *fenigan* was disconsolate. "I ate the last of that canned bread. I knew they'd take it away from me anyway—if I didn't store it in my stomach. Listen to those birds!" There was a scratching, shoveling sound. "They're filling in the tunnel."

"Wonder what Johanigman is doing. It better be good."

They hadn't heard from Johanigman since the day they'd been in the *fenigan* together.

It was apparent they were really going to starve this time. But thirst would surely be what would send them off.

Kane sat with knees drawn up to his swelling chest. He was shivering. "If Johanigman had hung around a few minutes more, things would be different. He could've kept 'em sitting, afraid to step on a germ. Say, where's the door in the *fenigan?*"

"Up top. Can't reach it."

"Even if you stood on my shoulders?"

"Nope."

"What if we excavated a few

feet of dirt from our side of the tunnel?"

"Then stood on the dirt?" Hubbard's voice was galvanized. "Hey! We can try that! Maybe we can unfasten the door somehow!"

They were working on that when there was a hollow drumming sound on the outside wall of the *fenigan.*

"Kane!" Johanigman's muffled voice came.

Kane shook dirt from his torn hands, erupted with a joyful shout.

Johanigman said, "Listen! I've spent the last day and a half on tour of the villages around here. Yesterday, I called for another meeting, and only three chieftains showed up. They didn't want to hear any more bad news about *nun-nunkhav.* Idea being that what you can't see or hear won't hurt you. However, I worked on those three chieftains, then contacted every other village I could find."

A note of infernal joy sounded in Johanigman's voice. "There's merry hell a-working, men! I've got a dozen villages going into voluntary starvation!"

"Starvation?"

"Right. Another little offshoot of *nun-nunkhav* they've been unaware of for a few thousand years. Probably the movement will spread over the planet."

Kane made a sound in his throat. "Oh! So it's a case of who starves first, them or us."

"I'm doing my best for you," Johanigman said stiffly.

"Sorry. The whole set-up is making a wreck out of me. You're doing fine, Johanigman. Listen. How did you work it anyway?"

Johanigman laughed. "The electron microscope again. I showed them the bugs that live in *faja* flour. Tiny parasites fifty times too small for the eye. I explained how the stomach juices killed the helpless little beasts. They were horrified. To make it worse—and final—I

took a sample of any kind of food they cared to test. Bugs, lots of bugs."

Kane swore roundly, in complete amazement. "Can you tie that! And they fell for it?"

"Like rolling off a cloud, Kane. After all, what are the rules of *nun-nunkhav?* In the furtherance of your own life, you must under no account harm or kill any other sentient life. Those bugs are plenty sentient. They hop around like mad. Now the thing for you men to do is to hold on. I've got my next step planned."

There was a silence. Then a freezing premonition seized Kane.

"Look here, Johanigman!" he snapped. "Watch out for yourself! How far do you think you can push these people? What's the next step?"

Johanigman's returning voice had in it a shrug of smug satisfaction. "Simple. Nobody in his right mind, be he a religious fanatic or not, is going to let himself starve if there's food around. This time they'll come to me, and they'll *want* me to twist them around my little finger. Understand?"

"And how," said Kane sarcastically, "are you going to twist them?"

"The electron microscope again. I'll show them that all life is composed of lifeless atoms. Moreover, that such atoms eventually make up the organic molecules which form life. I'll tell them they can't really kill life or be unkind to life, because if they kill a *mord* who is eating *faja* flour, that *mord* won't ever eat *faja* flour again, and the extra amount of *faja* flour will go toward increasing their own population. Thus life is never destroyed, only transferred."

"Wow!" said Kane. "That's pretty thin."

Johanigman laughed. "Variations of the process I've used on this planet have worked wonders on other planets. Don't worry. I'll have you out of there in no time."

There were three days all told when Kane and Hubbard had neither food or water. Much of that time, they worked on the stubborn door, first one, then the other, standing on a pair of shoulders.

The *fenigan* was reinforced on the inside by an almost metallic wood frame. However, where the frame encroached upon the hinged hatchway set in the apex of the *fenigan,* two or three inches of dried mud was exposed. Kane and Hubbard dug this out with belt buckles.

Johanigman hadn't shown up. Kane was certain something had happened.

Moreover, listening to the village sounds, he found no indications that anybody was starving. The *mords* and the *kibber* birds and all the other Konara parasites showed up on schedule. Children played as vociferously as before.

The chattering voices of women grinding their *faja* flour alone was missing.

At the end of the third day, Kane and Hubbard succeeded. They made a hole clear through the

fenigan. Then they waited until the village sounds had abated and they knew it was night.

Kane's arm was too thick to go through the hole, but Hubbard made it. He strained with all the strength and effort he could extort from his exhausted, dehydrated body. His two fingers caught the pin that latched the hatch. He pulled it out. He let out a slow, satisfied gurgle as he pushed the hatch up and cold starlight flooded down.

Hubbard hoisted himself to the conical top of the *fenigan.* Kane, waiting, heard him make a sound of dismay. *"Aark!"*

Kane felt his hopes sink to the bottom of a pit. "What's the matter?" he snapped.

He had his answer. A babble of shrill, excited voices smashed at him in a solid wave, as if they had been dammed up too long.

Above that, Hubbard yelled down despairingly, "The whole village is turned out. They're all around the *fenigan.* One of them must have seen my arm coming out and called the others. They snuck up without a sound. Can you imagine it? The sneaks." He sounded completely discouraged. He said dolefully, "It's no use, Kane. They got us. I'm coming down."

"No you don't!" roared Kane. His curses quivered the *fenigan.* "There's a rope ladder hanging down the side of the *fenigan.* Draw it up and let it down, hear me?"

Hubbard let it down, and Kane dragged himself up, panting. He barely made it. He pushed Hubbard insistently, and together they slid down the sides of the *fenigan,* leaned weakly against it, two dirty, starved scarecrows.

The Konaras abated their terrific excitement a trifle and crowded in toward Kane and Hubbard. There were men, women and children. They watched Kane and Hubbard avidly.

Kane was in a bad mood. He snarled at them. Hubbard said, "Well, anyway they won't hurt us."

"Yeah! They didn't hurt you when they forced you to enter the *fenigan,* did they? All they did was to keep on crowding in on you, and if you didn't go where they wanted you knew darned well the whole crowd of 'em would have walked right over you. Subtle, those Konaras!"

The Konaras kept pressing closer, but they seemed terrifically uncertain of themselves.

This went on for some time and then Trio came pushing through the crowd.

"Look at him!" muttered Hubbard. "As fat and sleek as if he never missed a meal in his life!"

Trio approached them, rubbing his hands and bowing and kicking dirt out from beneath his sandaled feet.

Kane came erect, raving. "It's about time you showed up!" he roared. "You louse of a Konara. Who do you think you're fooling?"

Trio smiled happily, and his eyes rested everywhere except on Kane. "Ah! The *scodders* Kane and Hubbard have been freed by the gods, even as the gods have freed

us Konaras from the necessity of eating!"

"Why, you hypocrite!" Kane towered over Trio. "Trio, where's Johanigman?"

Trio moaned, covering his face with his hands. "Do not speak of the Pishin Ghost! He is languishing in the village of the chief Cavil to the south. If such a thing is possible, the Pishin Ghost will die!"

Kane looked at Hubbard and sneered and made a jerking motion with his head. He went full-tilt for the crowd of Konaras, his jaw out.

The Konaras didn't give way. Kane expected to find himself confronted with a solid wall of unyielding flesh. But at the last minute, as he showed no sign of stopping, they fell over each other making a lane. Kane and Hubbard staggered through and went straight for Kane's *cree*.

It took them a couple hours before they felt like whole men again. Hubbard, after eating and drinking and washing, wanted to go to sleep, but Kane snapped, "No! We're going to Cavil's village."

He took a couple blast-rifles from a wall hook, shoved one at Hubbard. "I'm going to kill a *mord*—and let any of those lousy Konaras try to stop me!"

As they plowed at breakneck speed through the early morning jungle, Kane panted, "Did you notice that none of the *faja* flour grinders were outside the *crees?*"

Hubbard drawled, "Sure. The dirty unbelievers."

"I don't know if they are unbelievers. I can't figure them out—this business of deciding Johanigman's a Ghost.

"Sure. He's a Pishin Ghost. There are three types of Ghosts, of which the Pishin is the mightiest. These Ghosts are eternally striving to make Konaras believe they can kill and eat meat and still attain enlightenment."

They broke into Cavil's village in broad daylight. Konaras stopped whatever they were doing and broke into excited outcries. As in Trio's village, it was apparent that the gods were fixing some mighty fine banquets for these people.

Kane immediately sought out Cavil. He tried to enter Cavil's *cree* but Cavil emerged and hastily pulled the curtains shut over the door. He approached Kane with a cringing sidewise motion.

Kane said, in a voice of thunder, "You, Cavil! Free Johanigman!"

Cavil shook and trembled. "I cannot," he moaned. "Johanigman is a Pishin Ghost. Lo! he came amongst us, and bade us eat of the *faja* flour, which contains animal life. But we do not eat. The gods feed us."

Kane whirled, swept the village with darkening glance. He was hoping to see a *mord*. Unfortunately, there weren't any *mords*, and Kane was disappointed, as he wanted to make a big splash. Next best thing was the piglike creatures. They were six-legged. They had snouts. They were firm meaty beasts six hands tall.

Kane raised his rifle to his shoul-

der, and with a wicked eye noted that the village was frozen in horror, watching him. Kane pulled the trigger, there was a muffled report and the beast turned around with a stiff-legged jump and observed Kane. The beast had an accusing expression. Then it fell over dead.

Hubbard said quaveringly, terminating the long silence, "Now it gives hellfire!"

The silence broke. Children ran screaming. Men and women fell to their knees and began to pound the dust in agony. Kane looped his rifle over his shoulder and swaggeringly faced Cavil. Cavil was drooping, a strange sick expression on his face.

"Now, chief," Kane beamed, "let him who has not sinned cast the first stone, eh?"

It was apparent that Cavil was going to throw no stones. He fell to a kneeling position, beating the dust and whimpering and rubbing dust in his hair and up his nostrils. Hubbard followed after Kane.

They climbed the rope ladder of the village *fenigan,* let the ladder down and pulled Johanigman up. Johanigman took a look at the confusion, then asked Kane for a drink from his canteen. He drank noisily, his wedge-shaped Adam's apple moving up and down. Then they headed into the jungle, in no special hurry.

When they were halfway to Trio's village, Johanigman said, looking pleased, "Well, I guess I've

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busted *nun-nunkhav*."

"Listen to the man!" said Kane, amazed. He thumped his chest. "*I* busted it!"

"No," said Johanigman. "You've got it wrong, Kane. Cavil approached me, asking for some way to beat the starvation principle. I gave him the line about atoms and organic molecules—whereupon he declared me to be a Pishin Ghost, come to lead them astray. I wasn't a Ghost, of course—I was a goat; a scapegoat, the sacrificial lamb who could wash away their sins. O.K., so I blundered into a trap.

"But Kane, as soon as I convinced them that every time they baked a loaf of *faja* bread they were killing life, *nun-nunkhav* was done for. After a certain amount of starvation, they broke down, as I knew they would. Each family moved its *faja* flour grinders in its *cree* and everybody began to eat in secret, where, if you don't admit what everybody knows, you can pretend it isn't so.

"After awhile everybody would start eating out in the open again, but no Konara would ever brag about his religion again. Understand, there may be the instinct for religion in all of us, but not for fanaticism. Believe me, the search for food is an instinct, too, and nobody's going to stop and reflect on the religious teachings of his life when he's afflicted with severe stomach pangs."

Kane grumpily conceded the point. "But you gotta admit that if I hadn't killed that sacred pig right in the open, they might have found their way back to another religion tougher to crack than *nun-nunkhav*—and before the Council could get the planet settled, too."

"An extremely important precedent," nodded Johanigman, agreeing.

When they broke into the village, a *mord* had just come screaming out of the jungle. Hubbard was seized with excitement. He bought his blast-rifle up.

"Men," he yelled, sighting, "guess the entree of our next meal!"

THE END.

The Power

by MURRAY LEINSTER

So Earth's never been visited by people from extra-solar planets? Well—let's consider what would have happened, just a few years back, when historical records were fairly accurate.

Illustrated by Kramer

(Memorandum from Professor Charles, Latin Department, Haverford University, to Professor McFarland, the same faculty:

Dear Professor McFarland:

In a recent batch of fifteenth-century Latin documents from abroad, we found three which seem to fit together. Our interest is in the Latin of the period, but their contents seems to bear upon your line. I send them to you with a free translation. Would you let me know your reaction?

Charles.)

To Johannus Hartmannus, Licentiate in Philosophy, Living at the house of the Goldsmith Grote, Lane of the Dyed Fleece, Leyden, the Low Countries.

Friend Johannus:

I write this from the Goth's Head Inn, in Padua, the second day after Michaelmas, Anno Domini 1482. I write in haste because a worthy Hollander here journeys homeward and has promised to carry mails for me. He is an amiable lout, but ignorant. Do not speak to him of mysteries. He knows nothing. Less than nothing. Thank him, give him to drink, and speak of me as a pious and worthy student. Then forget him.

I leave Padua tomorrow for the realization of all my hopes and yours. This time I am sure. I came here to purchase perfumes and mandragora and the other necessities for an Operation of the utmost imaginable importance, which I will conduct five nights hence upon a certain hilltop near the village of Montevecchio. I have found a Word and a Name of incalculable power, which in the place that I know of must open to me knowledge of my mysteries. When you read this, I shall possess powers of which Hermes Trismegestus only guessed, and which Albertus Magnus could speak of only by hearsay. I have been deceived before, but this time I am sure. I have seen proofs!

I tremble with agitation as I write to you. I will be brief. I came upon these proofs and the Word and the Name in the village of Montevecchio. I rode into the village at nightfall, disconsolate because I had wasted a month searching for a learned man of whom I had heard great things. Then I found him—and he was but a silly antiquary with no knowledge of mysteries! So, riding upon my way I came to Montevecchio, and there they told me of a man dying even then because he had worked wonders. He had entered the village on foot only the day before. He was clad in rich garments, yet he spoke like a peasant. At first he was mild and humble, but he paid for food and wine with a gold piece, and villagers fawned upon him and asked for alms. He flung them a handful of gold pieces and when the news spread the whole village went mad with greed. They clustered about him, shrieking pleas, and thronging ever the more urgently as he strove to satisfy them. It is said that he grew frightened and would have fled because of their thrusting against him. But they plucked at his garments, screaming of their poverty, until suddenly his rich clothing vanished in the twinkling of an eye and he was but another ragged peasant like themselves and the purse from which he had scattered gold became a mere coarse bag filled with ashes.

This had happened but the day before my arrival, and the man was yet alive, though barely so because the villagers had cried witchcraft and beset him with flails and stones and then dragged him to the village priest to be exorcised.

I saw the man and spoke to him, Johannus, by representing myself to the priest as a pious student of the snares Satan has set in the form of witchcraft. He barely breathed, what with broken bones and pitchfork wounds. He was a native of the district, who until now had seemed a simple ordinary soul. To secure my intercession with the priest to shrive him 'ere he died, the man told me all. And it was much!

Upon this certain hillside where I shall perform the Operation five nights hence, he had dozed at midday. Then a Power appeared to him and offered to instruct him in mysteries. The peasant was stupid. He asked for riches instead. So the Power gave him rich garments and a purse which would never empty so long—said the Power—as it came not near a certain metal which destroys all things of mystery. And the Power warned that this was payment that he might send a learned man to learn what he had offered the peasant, because he saw that peasants had no understanding. Thereupon I told the peasant that I would go and greet this Power and fulfill his desires, and he told me the Name and the Word which would call him, and also the Place, begging me to intercede for him with the priest.

The priest showed me a single gold piece which remained of that which the peasant had distributed. It was of the age of Antonious Pious, yet bright and new as if fresh-minted. It had the weight and feel of true gold. But the priest, wryly, laid upon it the crucifix he wears upon a small iron chain about his waist. Instantly it vanished, leaving behind a speck of glowing coal which cooled and was a morsel of ash.

This I saw, Johannus! So I came speedily here to Padua, to purchase perfumes and mandragora and the other necessitites for an Operation to pay great honor to this Power whom I shall call up five nights hence. He offered wisdom to the peasant, who desired only gold. But I desire wisdom more than gold, and surely I am learned concerning mysteries and Powers! I do not know any but yourself who surpasses me in true knowledge of secret things. And when you read this, Johannus, I shall surpass even you! But it may be that I will gain knowledge so that I can transport myself by a mystery to your attic, and there inform you myself, in advance of this letter, of the results of this surpassing good fortune which causes me shake with agitation whenever I think of it.

Your friend Carolus,
At the Goth's Head
Inn in Padua.

. . . Fortunate, perhaps, that an opportunity has come to send a second missive to you, through a crippled man-at-arms who has been discharged from a mercenary band and travels homeward to sit in the sun henceforth. I have given him one gold piece and promised that you would give him another on receipt of this message. You will keep that promise or not, as pleases

you, but there is at least the value of a gold piece in a bit of parchment with strange symbols upon it which I inclose for you.

Item: I am in daily communication with the Power of which I wrote you, and daily learn great mysteries.

Item: Already I perform marvels such as men have never before accomplished, by means of certain sigils or talismans the Power has prepared for me.

Item: Resolutely the Power refuses to yield to me the Names or the incantations by which these things are done so that I can prepare such sigils for myself. Instead, he instructs me in divers subjects which have no bearing on the accomplishment of wonders, to my bitter impatience which I yet dissemble.

Item: Within this packet there is a bit of parchment. Go to a remote place and there tear it and throw it upon the ground. Instantly, all about you, there will appear a fair garden with marvelous fruits, statuary, and pavilions. You may use this garden as you will, save that if any person enter it, or you yourself, carrying a sword or dagger or any object however small made of iron, the said garden will disappear immediately and nevermore return.

This you may verify when you please. For the rest, I am like a person trembling at the very door of Paradise, barred from entering beyond the antechamber by the fact of the Power withholding from me the true essentials of mystery, and granting me only crumbs—which, however, are greater marvels than any known certainly to have been practiced before. For example, the parchment I send you. This art I have proven many times. I have in my scrip many such sigils, made for me by the Power at my entreaty. But when I have secretly taken other parchments and copied upon them the very symbols to the utmost exactitude, they are valueless. There are words or formulas to be spoken over them or—I think more likely—a greater sigil which gives the parchments their magic property. I begin to make a plan—a very daring plan—to acquire even this sigil.

But you will wish to know of the Operation and its results. I returned to Montevecchio from Padua, reaching it in three days. The peasant who had worked wonders was dead, the villagers having grown more fearful and beat out his brains with hammers. This pleased me, because I had feared he would tell another the Word and Name he had told me. I spoke to the priest, and told him that I had been to Padua and secured advice from high dignitaries concerning the wonder-working, and had been sent back with special commands to seek out and exorcise the foul fiend who had taught the peasant such marvels.

The next day—the priest himself aiding me!—I took up to the hilltop the perfumes and wax tapers and other things needed for the Operation. The priest trembled, but he would have remained had I not sent him away. And night fell,

and I drew the magic circle and the pentangle, with the Signs in their proper places. And when the new moon rose, I lighted the perfumes and the fine candles and began the Operation. I have had many failures, as you know, but this time I knew confidence and perfect certainty. When it came time to use the Name and the Word I called them both loudly, thrice, and waited.

Upon this hilltop there were many grayish stones. At the third calling of the Name, one of the stones shivered and was not. Then a voice said dryly:

"Ah! So that is the reason for this stinking stuff? My messenger sent you here?"

There was a shadow where the stone had been and I could not see clearly. But I bowed low in that direction:

"Most Potent Power," I said, my voice trembling because the Operation was a success, "a peasant working wonders told me that you desired speech with a learned man. Beside your Potency I am ignorant indeed, but I have given my whole life to the study of mysteries. Therefore I have come to offer worship or such other compact as you may desire in exchange for wisdom."

There was a stirring in the shadow, and the Power came forth. His appearance was that of a creature not more than an ell and a half in height, and his expression in the moonlight was that of sardonic impatience. The fragrant smoke seemed to cling about him; to make a cloudiness close about his form.

"I think," said the dry voice, "that you are as great a fool as the peasant I spoke to. What do you think I am?"

"A Prince of Celestial Race, your Potency," I said, my voice shaking.

There was a pause. The Power said as if wearily:

"Men! Fools forever! Oh, man, I am simply the last of a number of my kind who traveled in a fleet from another star. This small planet of yours has a core of the accursed metal, which is fatal to the devices of my race. A few of our ships came too close. Others strove to aid them, and shared their fate. Many, many years since, we descended from the skies and could never rise again. Now I alone am left."

Speaking of the world as a planet was an absurdity, of course. The planets are wanderers among the stars, traveling in their cycles and epicycles as explained by Ptolemy a thousand years since. But I saw at once that he would test me. So I grew bold and said:

"Lord, I am not fearful. It is not needful to cozen me. Do I not know of those who were cast out of Heaven for rebellion? Shall I write the name of your leader?"

He said "Eh?" for all the world like an elderly man. So smiling, I wrote on the earth the true name of Him whom the vulgar call Lucifer. He regarded the markings on the earth and said:

"Bah! It is meaningless. More of your legendry! Look you, Man, soon I shall die. For more years

than you are like to believe I have hid from your race and its accursed metal. I have watched men, and despised them. But— I die. And it is not good that knowledge should perish. It is my desire to impart to men the knowledge which else would die with me. It can do no harm to my own kind, and may bring the race of men to some degree of civilization in the course of ages."

I bowed to the earth before him. I was aflame with eagerness.

"Most Potent One," I said joyfully. "I am to be trusted. I will guard your secrets fully. Not one jot nor tittle shall ever be divulged!"

Again his voice was annoyed and dry.

"I desire that this knowledge be spread abroad so that all may learn it." Then he made a sound which I do not understand, save that it seemed to be derisive. "But what I have to say may serve, even garbled and twisted. And I do not think you will keep secrets inviolate! Have you pen and parchment?"

"Nay, Lord!"

"You will come again, then, prepared to write what I shall tell you."

But he remained, regarding me. He asked me questions, and I answered eagerly. Presently he spoke in a meditative voice, and I listened eagerly. His speech bore an odd similarity to that of a lonely man who dwelt much on the past, but soon I realized that he spoke in ciphers, in allegory, from which now and again the truth peered out. As one who speaks for the sake of remembering he spoke of the home of his race upon what he said was a fair planet so far distant that to speak of leagues and even the span of continents would be useless to convey the distance. He told of cities in which his fellows dwelt—here, of course, I understood his meaning perfectly—and told of great fleets of flying things rising from those cities to go to other fair cities, and of music which was in the very air so that any person, anywhere upon the planet, could hear sweet sounds or wise discourse at will. In this matter there was no metaphor, because the perpetual sweet sounds in Heaven are matters of common knowledge. But he added a metaphor immediately after, because he smiled at me and observed that the music was not created by a mystery, but by waves like those of light, only longer. And this was plainly a cipher, because light is an impalpable fluid without length and surely without waves!

Then he spoke of flying through the emptiness of the empyrean, which again is not clear, because all can see that the heavens are fairly crowded with stars, and he spoke of many suns and other worlds, some frozen and some merely barren rock. The obscurity of such things is patent. And he spoke of drawing near to this world which is ours, and of an error made as if it were in mathematics—instead of in rebellion—so that they drew too close to Earth as Icarus to the sun. Then again he spoke in metaphors, because he referred to engines, which are things to cast stones against walls, and in a larger sense for grinding corn and pumping water. But he spoke of engines growing hot because of the accursed metal in the core of Earth, and of the inability of his kind to resist Earth's pull—more metaphor—and then he spoke of a screaming descent from the skies. And all of this, plainly, is a metaphorical account of the casting of the Rebels out of Heaven, and an acknowledgment that he is one of the said Rebels.

When he paused, I begged humbly that he would show me a mystery, and of his grace give me protection in case my converse with him became known.

"What happened to my messenger?" asked the Power.

I told him, and he listened without stirring. I was careful to tell him exactly, because, of course, he would know that—as all else—by his powers of mystery, and the question was but another test. Indeed, I felt sure that the messenger and all that had taken place had been contrived by him to bring me, a learned student of mysteries, to converse with him in this place.

"Men!" he said bitterly at last. Then he added coldly. "Nay! I can give you no protection. My kind is without protection upon this earth. If you would learn what I can teach you, you must risk the fury of your fellow-countrymen."

"But then, abruptly, he wrote upon parchment and pressed the parchment to some object at his side. He threw it upon the ground.

"If men beset you," he said scornfully, "tear this parchment and cast it from you. If you have none of the accursed metal about you, it may distract them while you flee. But a dagger will cause it all to come to naught!"

Then he walked away. He vanished. And I stood shivering for a very long time before I remembered me of the formula given by Appolonious of Tyana for the dismissal of evil spirits. I ventured from the magic circle. No evil befell me. I picked up the parchment and examined it in the moonlight. The symbols upon it were meaningless, even to one like myself who has studied all that is known of mysteries. I returned to the village, pondering.

I have told you so much at length, because you will observe that this Power did not speak with the pride or the menace of which most authors on mysteries and Operations speak. It is often said that an adept must conduct himself with great firmness during an Operation, lest the Powers he has called up overawe him. Yet this Power spoke wearily, with irony, like one approaching death. And he had spoken of death, also. Which, were of course, a test and a deception, because are not the Principalities and Powers of Darkness immortal? He had some design it was not his will that I should know. So I saw that I must walk warily in this priceless opportunity.

In the village I told the priest that I had had encounter with a foul fiend, who begged that I not exorcise him, promising to reveal certain hidden treasures once belonging to the Church, which he could not touch or reveal to evil men because they were holy, but could describe the location of to me. And I procured parchment, and pens, and ink, and the next day I went alone to the hilltop. It was empty, and I made sure I was unwatched and—leaving my dagger behind me—I tore the parchment and flung it to the ground.

As it touched, there appeared such a treasure of gold and jewels as truly would have driven any man mad with greed. There were bags and chests and boxes filled with gold and precious stones, which had burst with the weight and spilled out upon the ground. There were gems glittering in the late sunlight, and rings and necklaces set with brilliants, and such monstrous hoards of golden coins of every antique pattern.

Johannus, even I went almost mad! I leaped forward like one dreaming to plunge my hands into the gold. Slavering, I filled my garments with rubies and ropes of pearls, and stuffed my scrip with

gold pieces, laughing crazily to myself. I rolled in the riches. I wallowed in them, flinging the golden coins into the air and letting them fall upon me. I laughed and sang to myself.

Then I heard a sound. On the instant I was filled with terror for the treasure. I leaped to my dagger and snarled, ready to defend my riches to the death.

Then a dry voice said:

"Truly you care naught for riches!"

It was savage mockery. The Power stood regarding me. I saw him clearly now, yet not clearly because there was a cloudiness which clung clearly to his body. He was, as I said, an ell and a half in height, and from his forehead there protruded knobby feelers which were not horns but had somewhat the look save for bulbs upon their ends. His head was large and— But I will not attempt to describe him, because he could asume any of a thousand forms, no doubt, so what does it matter?

Then I grew terrified because I had no Circle or Pentangle to protect me. But the Power made no menacing move.

"It is real, that riches," he said dryly. "It has color and weight and the feel of substance. But your dagger will destroy it all."

Didyas of Corinth has said that treasure of mystery must be fixed by a special Operation before it becomes permânent and free of the power of Those who brought it. They can transmute it back to leaves or other rubbish, if it be not fixed.

"Touch it with your dagger," said the Power.

I obeyed, sweating in fear. And as the metal iron touched a great piled heap of gold, there was a sudden shifting and then a little flare of heat about me. And the treasure—all, to the veriest crumb of a seed pearl!—vanished before my eyes. The bit of parchment reappeared, smoking. It turned to ashes. My dagger scorched my fingers. It had grown hot.

"Ah yes," said the Power, nodding. "The force-field has energy. When the iron absorbs it, there is heat." Then he looked at me in a not unfriendly way. "You have brought pens and parchment," he said, "and at least you did not use the sigil to astonish your fellows. Also you had the good sense to make no more perfumish stinks. It may be that there is a grain of wisdom in you. I will bear with you yet a while. Be seated and take parchment and pen. Stay! Let us be comfortable. Sheathe your dagger, or better cast it from you."

I put it in my bosom. And it was as if he thought, and touched something at his side, and instantly there was a fair pavillion about us, with soft cushions and a gently playing fountain.

"Sit," said the Power. "I learned that men like such things as this from a man I once befriended. He had been wounded and stripped by robbers, so that he had not so much as a scrap of accursed metal about him, and I could aid him. I learned to speak the language men use nowadays from him. But to the

end he believed me an evil spirit and tried valorously to hate me."

My hands shook with my agitation that the treasure had departed from me. Truly it was a treasure of such riches as no King has ever possessed, Johannus! My very soul lusted after that treasure! The golden coins alone would fill your attic solidly, but the floor would break under their weight, and the jewels would fill hogsheads. Ah, Johannus! That treasure!

"What I will have you write," said the Power, "at first will mean little. I shall give facts and theories first, because they are easiest to remember. Then I will give the applications of the theories. Then you men will have the beginning of such civilization as can exist in the neighborhood of the accursed metal."

"Your Potency!" I begged abjectly. "You will give me another sigil of treasure?"

"Write!" he commanded.

I wrote. And, Johannus, I cannot tell you myself what it is that I wrote. He spoke words, and they were in such obscure cipher that they have no meaning as I con them over. Hark you to this, and seek wisdom for the performance of mysteries in it! "The civilization of my race is based upon fields of force which have the property of acting in all essentials as substance. A loadestone is surrounded by a field of force which is invisible and impalpable. But the fields used by my people for dwellings, tools, and even for machinery are perceptible to the senses and act physically as solids. More, we are able to form these fields in latent fashion; and to fix them to organic objects as permanent fields which require no energy for their maintenance, just as magnetic fields require no energy-supply to continue. Our fields, too, may be projected as three-dimensional solids which assume any desired form and have every property of substance except chemical affinity."

Johannus! Is it not unbelievable that words could be put together, dealing with mysteries, which are so devoid of any clue to their true mystic meaning? I write and I write in desperate hope that he will eventually give me the key, but my brain reels at the difficulty of extracting the directions for Operations which such ciphers must conceal! I give you another instance: "When a force-field generator has been built as above, it will be found that the pulsatory fields which are consciousness serve perfectly as controls. One has but to visualize the object desired, turn on the generator's auxiliary control, and the generator will pattern its output upon the pulsatory consciousness-field—"

Upon this first day of writing, the Power spoke for hours, and I wrote until my hand ached. From time to time, resting, I read back to him the words that I had written. He listened, satisfied.

"Lord!" I said shakenly. "Mighty lord! Your Potency! These mysteries you bid me write—they are beyond comprehension!"

But he said scornfully:

"Write! Some will be clear to

someone. And I will explain a little by a little until even you can comprehend the beginning." Then he added. "You grow weary. You wish a toy. Well! I will make you a sigil which will make again that treasure you played with. I will add a sigil which will make a boat for you, with an engine drawing power from the sea to carry you wheresoever you wish without need of wind or tide. I will make others so you may create a palace where you will, and fair gardens as you please—"

These things he has done, Johannus. It seems to amuse him to write upon scraps of parchment, and think, and then press them against his side before he lays them upon the ground for me to pick up. He has explained amusedly that the wonder in the sigil is complete, yet latent, and is released by the tearing of the parchment, but absorbed and destroyed by iron. In such fashions he speaks in ciphers, but otherwise sometimes he jests!

It is strange to think of it, that I have come a little by a little to accept this Power as a person. It is not in accord with the laws of mystery. I feel that he is lonely. He seems to find satisfaction in speech with me. Yet he is a Power, one of the Rebels who was flung to

earth from Heaven! He speaks of that only in vague, metaphorical terms, as if he had come from another world like *the* world, save much larger. He refers to himself as a voyager of space, and speaks of his race with affection, and of Heaven—at any rate the city from which he comes, because there must be many great cities there—with a strange and prideful affection. If it were not for his powers, which are of mystery, I would find it possible to believe that he was a lonely member of a strange race, exiled forever in a strange place, and grown friendly with a man because of his loneliness. But how could there be such as he and not a Power? How could there be another world?

This strange converse has now gone on for ten days or more. I have filled sheets upon sheets of parchment with writing. The same metaphors occur again and again. "Force-fields"—a term without literal meaning—occurs often. There are other metaphors such as "coils" and "primary" and "secondary" which are placed in context with mention of wires of copper metal. There are careful descriptions, as if in the plainest of language, of sheets of dissimilar metals which are to be placed in acid, and other descriptions of plates of similar metal which are to be separated by layers of air or wax of certain thicknesses, with the plates of certain areas! And there is an explanation of the means by which he lives. "I, being accustomed to an atmosphere much more dense than that on Earth, am forced to keep about myself a field of force which maintains an air-density near that of my home planet for my breathing. This field is transparent, but because it must shift constantly to change and refresh the air I breathe, it causes a certain cloudiness of outline next my body. It is maintained by the generator I wear at my side, which at the same time provides energy for such other force-field artifacts as I may find convenient." Ah, Johannus! I grow mad with impatience! Did I not anticipate that he would some day give me the key to this metaphorical speech, so that from it may be extracted the Names and the Words which cause his wonders, I would give over in despair.

Yet he has grown genial with me. He has given me such sigils as I have asked him, and I have tried them many times. The sigil which will make you a fair garden is one of many. He says that he desires to give to man the knowledge he possesses, and then bids me write ciphered speech without meaning, such as: "The drive of a ship for flight beyond the speed of light is adapted from the simple-drive generator already described, simply by altering its constants so that it cannot generate in normal space and must create an abnormal space by tension. The process is—" Or else— "I choose at random, Johannus—" The accursed metal, iron, must be eliminated not only from all circuits but from nearness to apparatus using high-frequency oscillations, since it absorbs their

energy and prevents the functioning—"

I am like a man trembling upon the threshold of Paradise, yet unable to enter because the key is withheld. "Speed of light!" What could it mean in metaphor? In common parlance, as well speak of the speed of weather or of granite! Daily I beg him for the key to his speech. Yet even now, in the sigils he makes for me is greater power than any man has ever known before!

But it is not enough. The Power speaks as if he were lonely beyond compare; the last member of a strange race upon Earth; as if he took a strange, companionlike pleasure in merely talking to me. When I beg him for a Name or a Word which would give me power beyond such as he doles out in sigils, he is amused and calls me fool, yet kindly. And he speaks more of his metaphorical speech about forces of nature and fields of force—and gives me a sigil which should I use it will create a palace with walls of gold and pillars of emerald! And then he amusedly reminds me that one greedy looter with an ax or hoe of iron would cause it to vanish utterly!

I go almost mad, Johannus! But there is certainly wisdom unutterable to be had from him. Gradually, cautiously, I have come to act as if we were merely friends, of different race and he vastly the wiser, but friends rather than Prince and subject. Yet I remember the warnings of the most authoritative authors that one must be ever on guard against Powers called up in an Operation.

I have a plan. It is dangerous, I well know, but I grow desperate. To stand quivering upon the threshold of such wisdom and power as no man has ever dreamed of before, and then he denied—

The mercenary who will carry this to you leaves tomorrow. He is a cripple, and may be months upon the way. All will be decided ere you receive this. I know you wish me well.

Was there ever a student of mystery in so maddening a predicament, with all knowledge in his grasp yet not quite his?

Your friend,
Carolus.
Written in the very bad
inn in Montevecchio—

Johannus! A courier goes to Ghent for My Lord of Brahant and I have opportunity to send you mail. I think I go mad, Johannus! I have power such as no man ever possessed before, and I am fevered with bitterness. Hear me!

For three weeks I did repair daily to the hilltop beyond Montevecchio and take down the ciphered speech of which I wrote you. My scrip was stuffed with sigils, but I had not one Word of Power or Name of Authority. The Power grew mocking, yet it seemed sadly mocking. He insisted that his words held no cipher and needed but to be read. Some of them he phrased over and over again until they were but instructions for putting bits of metal together, mechanic-wise.

Then he made me follow those instructions. But there was no Word, no Name—nothing save bits of metal put together cunningly. And how could inanimate metal, not imbued with power of mystery by Names or Words or incantations, have power to work mystery?

At long last I became convinced that he would never reveal the wisdom he had promised. And I had come to such familiarity with this Power that I could dare to rebel, and even to believe that I had chance of success. There was the cloudiness about his form, which was maintained by a sigil he wore at his side and called a "generator." Were that cloudiness destroyed, he could not live, or so he had told me. It was for that reason that he, in person, dared not touch anything of iron. This was the basis of my plan.

I feigned illness, and said that I would rest at a peasant's thatched hut, no longer inhabited, at the foot of the hill on which the Power lived. There was surely no nail of iron in so crude a dwelling. If he felt for me the affection he protested, he would grant me leave to be absent in my illness. If his affection was great, he might even come and speak to me there. I would be alone in the hope that his friendship might go so far.

Strange words for a man to use to Power! But I had talked daily with him for three weeks. I lay groaning in the hut, alone. On the second day he came. I affected great rejoicing, and made shift to light a fire from a taper I had kept burning. He thought it a mark of honor, but it was actually a signal. And then, as he talked to me in what he thought my illness, there came a cry from without the hut. It was the village priest, a simple man but very brave in his fashion. On the signal of smoke from the peasant's hut, he had crept near and drawn all about it an iron chain that he had muffled with cloth so that it would make no sound. And now he stood before the hut door with his crucifix upraised, chanting exorcisms. A very brave man, that priest, because I had pictured the Power as a foul fiend indeed.

The Power turned and looked at me, and I held my dagger firmly.

"I hold the accursed metal," I told him fiercely. "There is a ring of it about this house. Tell me now, quickly, the Words and the Names which make the sigils operate! Tell me the secret of the cipher you had me write! Do this and I will slay this priest and draw away the chain and you may go hence unharmed. But be quick, or—"

The Power cast a sigil upon the ground. When the parchment struck earth, there was an instant's cloudiness as if some dread thing had begun to form. But then the parchment smoked and turned to ash. The ring of iron about the hut had destroyed its power when it was used. The Power knew that I spoke truth.

"Ah!" said the Power dryly. "Men! And I thought one was my friend!" He put his hand to his side. "To be sure! I should have

known. Iron rings me about. My engine heats—"

He looked at me. I held up the dagger, fiercely unyielding.

"The names!" I cried. "The Words! Give me power of my own and I will slay the priest!"

"I tried," said the Power quietly, "to give you wisdom. And you will stab me with the accursed metal if I do not tell you things which do not exist. But you need not. I cannot live long in a ring of iron. My engine will burn out. My force-field will fail. I will stifle in the thin air which is dense enough for you. Will not that satisfy you? Must you stab me also?"

I sprang from my pallet of straw to threaten him more fiercely. It was madness, was it not? But I was mad, Johannus!

"Forbear," said the Power. "I could kill you now, with me! But I thought you my friend. I will go out and see your priest. I would prefer to die at his hand. He is perhaps only a fool."

He walked steadily toward the doorway. As he stepped over the iron chain, I thought I saw a wisp of smoke begin, but he touched the thing at his side. The cloudiness about his person vanished. There was a puffing sound, and his garments jerked as if in a gust of wind. He staggered. But he went on, and touched his side again and the cloudiness returned and he walked more strongly. He did not try to turn aside. He walked directly toward the priest, and even I could see that he walked with a bitter dignity.

And— I saw the priest's eyes grow wide with horror. Because he saw the Power for the first time, and the Power was an ell and a half high, with a large head and knobbed feelers projecting from his forehead, and the priest knew instantly that he was not of any race of men but was a Power and one of those Rebels who were flung out from Heaven.

I heard the Power speak to the priest, with dignity. I did not hear what he said. I raged in my disappointment. But the priest did not waver. As the Power moved toward him, the priest moved toward the Power. His face was filled with horror, but it was resolute. He reached forward with the cruci-

fix he wore always attached to an iron chain about his waist. He thrust it to touch the Power, crying, *"In nomini Patri—"*

Then there was smoke. It came from a spot at the Power's side where was the engine to which he touched the sigils he had made, to imbue them with the power of mystery. And then—

I was blinded. There was a flare of monstrous, bluish light, like a lightning-stroke from heaven. After, there was a ball of fierce yellow flame which gave off a cloud of black smoke. There was a monstrous, outraged bellow of thunder.

Then there was nothing save the priest standing there, his face ashen, his eyes resolute, his eyebrows singed, chanting exorcisms in a shaking voice.

I have come to Venice. My scrip is filled with sigils with which I can work wonders. No man can work such wonders as I can. But I use them not. I labor daily, nightly, hourly, minute by minute, trying to find the key to the cipher which will yield the wisdom the Power possessed and desired to give to men. Ah, Johannus! I have those sigils and I can work wonders, but when I have used them they will be gone and I shall be powerless! I had such a chance at wisdom as never man possessed before, and it is gone! Yet I shall spend years—aye!—all the rest of my life, seeking the true meaning of what the Power spoke! I am the only man in all the world who ever spoke daily, for weeks on end, with a Prince of the Powers of Darkness, and was accepted by him as a friend to such a degree as to encompass his own destruction. It must be true that I have wisdom written down! But how shall I find instructions for mystery in such metaphors as—to choose a fragment by chance— "Plates of two dissimilar metals, immersed in an acid, generate a force for which men have not yet a name, yet which is the basis of true civilization. Such plates—"

I grow mad with disappointment, Johannus! Why did he not speak clearly? Yet I will find out the secret.

(Memorandum from Professor McFarland, Physics Department, Haverford University, to Professor Charles, Latin, the same faculty:

Dear Professor Charles:

My reaction is, Damnation! Where is the rest of this stuff?

McFarland.)

THE END.

Tool

Man, the tool-using animal, has, in more recent times, been using some rather hefty tools. The widgit shown on page 99 is a sort of ersatz finger muscle tool. Once upon a time man made his house out of mud-plastered sticks, and formed bowls out of clay, and he squeezed the moist clay into shape between his fingers.

Now he goes in for things made out of cold-rolled steel. So he needs fingers with more strength—more leverage, so to speak. The leverage involved in squeezing an eleven-ton billet of yellow-hot mild steel into I-beams is considerable. It takes even more to flatten out cold steel into smooth, neat strips of black steel plate. That nineteen thousand horsepower Allis-Chalmers made lever on page 99 is destined to amplify the push of a finger on a small lever to the magnitude of push required in a cold-rolling strip mill.

Inasmuch as a tool is something you make to do something with, that is a nineteen thousand horsepower tool.

Just above are parts of another tool in process of construction at Allis-Chalmers. The spiral housing of a hydroelectric turbine tends to be slightly colossal. After all, a river is supposed to work its way through . . .

The Elusive Microvolt

by GEORGE O. SMITH

It isn't the microvolt you want that's elusive; it's very easy indeed to get one. The elusive ones are the other 999,999 or so that insist on coming out too, and thoroughly gumming up the works. That's what makes getting one whole, but single, microvolt a nasty problem.

Photographs Courtesy Measurements Corporation

Most things you don't want around are fairly easy to get rid of, but there are a few things that can cause more darned trouble getting rid of 'em than getting them. Things like used razor blades, splinters in the fingers, and flypaper, dead whales and poor relations. Definitely high on the list of stick-to-you-ative things comes radio-frequency energy, when you want to get 0.000001 volt, and throw away 0.999999 volts. One precise microvolt; no more, no less.

Getting one microgram of a chemical salt is a fairly sane and simple procedure. Dissolve one gram in 1000 milliliters of solution, and measure out 1.0 milliliters of this solution. Dilute this 1.0 ml. to make 1000 ml. Take one ml. of this, and you have one microgram. Simple enough.

Now if it is just one microvolt of electrical potential you want, that's simple too; take two resistors, one of 999,999 ohms and the other of 1.0000 ohms, place in series, and apply one volt across the pair. One microvolt appears across the 1.000 ohm resistor. Well . . . yes. That's true enough, if you are working with direct current, or even with low alternating current frequencies. But not, not by any manner of means, if you're working with radio

Standard signal generator of the type used for development of home radio receivers, covering frequencies from 75 kc to 30 mc. This particular type combines the "Adjust Meter" and "Microvolts" slide; the upper right knob is the control, the right meter reads the signal level. The left-hand meter and controls handle the audio-frequency modulation. See Fig. 6

frequencies.

A glass of unwanted water can be tossed down the sink, and disposed of, too—provided you toss gently. Otherwise it may splash, liberally bedecking floor, walls, and tosser with the rebound. Radio frequencies act like that, only for "gently" read "low frequency," and for "sink" read "resistances." The higher stuff splashes from here to breakfast, that, of course, being why it is so darned useful; a splash of radio here will set electrons jiggling excitedly in Timbuctoo, Afghanistan and also, for that matter, on the Moon. It refuses to waste itself neatly away in any 1,000,000 ohm resistance; it takes off for long-distance flight instead, and shows up in the output leads, about 100 or 500 microvolts strong, instead of one microvolt.

Attaining a precise, whole, but single microvolt would seem to be a glittering bit of intellectual achievement, but of no more practical utility than statistics on the precise number of females between the ages of twenty-one and twenty-seven employed in the cheese mines of Switzerland.

Such a belief is in error.

The radio in your living room—and the radio in G. I. Joe's jeep, tank, or Mustang—was rated in sensitivity somewhere during its progress through the laboratory as

an experimental model. Somewhere around one or two hundred times, probably. It was also rated as it passed through the pilot model stage, again as a prototype, and further as a production model. The sensitivity of a receiver is stated in so many microvolts input required to produce one watt output. About the weakest signal that can be lifted up out of the mud-level of static, dried off, cleaned up, braced, and put forth as an intelligible message will rate between one and five microvolts. An actual signal of this level is normal subject to fading, hash, and extreme unreliability, and will not serve as a standard for rating receivers; for measuring purposes we want a synthetic radio station of known, adjustable and dependable faintness. The Standard Signal Generation supplies it.

The local radio service man uses, for his alignment and repair work, a rig labeled on the front, "Signal Generator." It sells for from thirty to one hundred fifty dollars, and is not to be confused with a *Standard* Signal Generator; they are large, massive, intricately and most carefully made, and sell for fifteen to twenty times as much. It not only generates signals, but *standard* signals, signals that can be depended on both for magnitude and frequency.

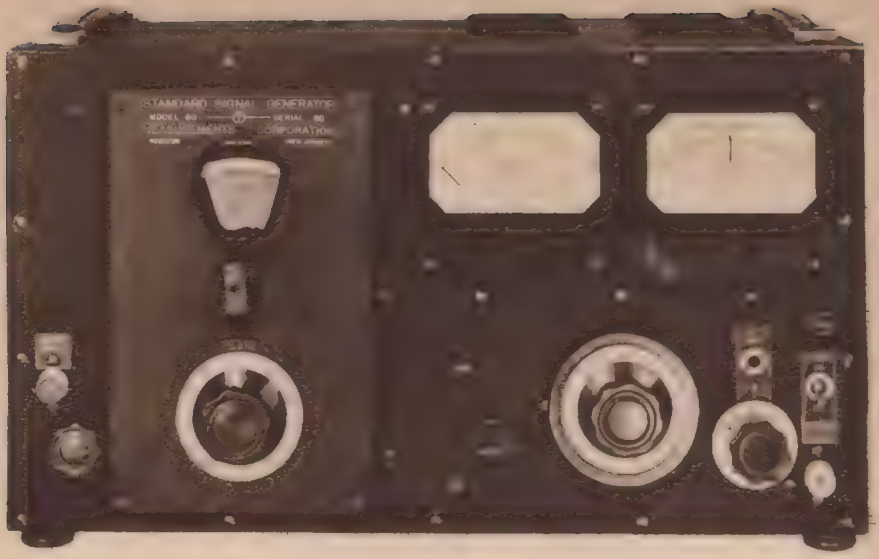
But to make it, that is a really tricky little problem. There simply isn't any dependable way of measuring one millionth of a volt directly; how then, to establish the validity of the dial's statement of "One Microvolt"?

The method employed in chemistry is still valid in electronics, if we can find a way to apply it and eliminate the wild splashing. The 999,999 ohm resistor in series with the one ohm resistor will divide one volt and give us one microvolt —but in addition to the spraying effect of radio frequency, there's the little question of making the resistors accurate to 0.00001%, a bit on the close-tolerance side for any production equipment. Figure 1 shows the basic idea.

But dividing the one volt into tenths is more practical; we can measure ten ohms with excellent accuracy. So, as in Figure 2, we divide the one volt into one-tenth, divide that into one-tenth of that, giving one one-hundredth volt (Figure 3). Carry the same system out, and eventually, as in Figure 4, we get down to the one microvolt we want.

This "Ladder Attenuator" system does the job of making a microvolt measurable; it's fairly simple to measure the one-volt input with good accuracy. The actual ladder does not contain real one-ohm resistors, since each of the vertical members is shunted by the next downward step, and for real accuracy the overall dividing resistance must be calculated and corrected to attain a true ten-to-one division.

A workable system exists; we can measure the resistances with a percentage accuracy well over on the right of the decimal point; the measurement of the one-volt input can be with a percentage accuracy to rub shoulders with that. There-



Standard signal generator for short-wave and ultra-short wave developmental work. This type covers frequencies from two megacycles to four hundred megacycles on six bands. In this one, the separate "Adjust Meter" and "Microvolts" sliders are used, so that the right-meter, measuring carrier strength, is a "set to line" type See attenuator circuit in Fig. 5.

fore the one microvolt output would be also accurate on the right side of the decimal point—if we stop Resistor #1 with 1,000,000 microvolts across it from spraying Resistor #X with many times the 1.00 microvolts its supposed to have.

We can even make the resistor-divider more flexible, so it will produce not only 1.00 microvolts, and ten-times multiples thereof, but 7.00 or 70.0 microvolts. We add a slide-wire attenuator, the resistance of which is directly proportional to the angular rotation. Then if we apply 0.7 volts to the beginning of the ladder attenuator, the tenths-down arrangement gives us an output of 0.07, 0.007, 0.0007 and so on down to 0.000,007, which is what we wanted.

In practical standard signal generators, the slide wire is set up and labeled "microvolts," while the attenuator step selector is labeled —X10, X100, X1000 and so forth. To get 3,500 microvolts then, you set the "Microvolts" dial to 3.5 and the multiplier to X1000.

And you can depend on it. If the spraying effect is stopped.

That can be done. In some signal generators, each resistor is built into its own, individual copper cubicle, and the linking effects of electrostatic fields are pretty thoroughly throttled. In others, a series

The interior of the model shown on page 194 with the layers of shielding removed. The exposed tubes on the left are rectifier, power regulator and audio-frequency tubes—and even they will be within the heavy shielding of the case. The oscillator elements are in the double shielding can.

of holes is drilled into a thick disk of solid copper or brass, and the resistors are sunk in the solid metal. Even radio frequency has considerable difficulty spraying far under such circumstances.

The resistors themselves are specially built to have the least possible inductance effects; winding the wire around a little ceramic insulator to provide the necessary resistance works fine for direct current. The result may be 10 ohms for DC, but at 1,000,000 cycles a second it turns into a choke coil with the equivalent of 500 ohms or so, due to the magnetic field effects around the coil. The special divider resistors are wound in various ways, depending on the manufacturer's own preference—there are a number of systems that eliminate, or vastly reduce, the frequency effects. Most depend essentially on winding the wire back and forth, so that the inductance of one turn cancels the inductance of the next. And the wire is not wound on spools, but on

flat mica cards; the greater the diameter of the loop a turn of wire makes, the greater the inductance. The card system makes the effective diameter as near zero as possible.

Before we get to the real headache of making that elusive microvolt come forth alone and whole, one more minor complication. The slide wire and ladder attenuator system, when fed with one exact volt, produces the desired fractions—but the volt must be exact. Tubes wear out—power line supply voltages fluctuate—no oscillator can work all the way from 100 kilocycles to 30 megacycles and produce exactly the same voltage all the way across.

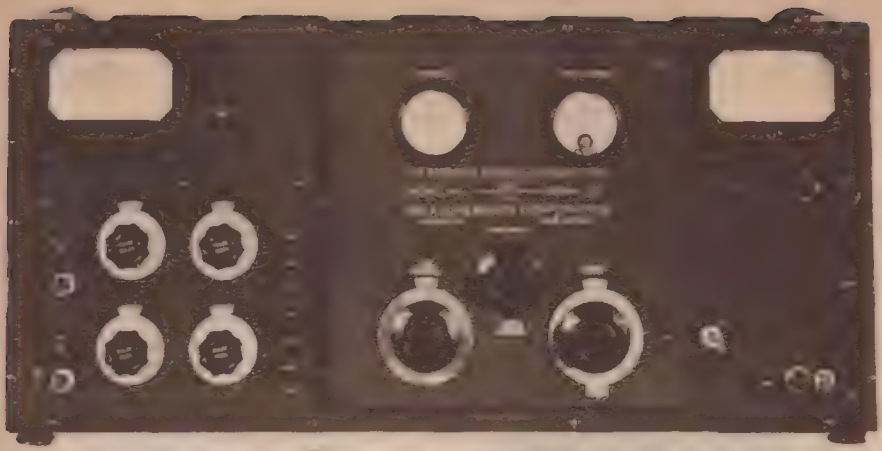
So the voltmeter is hung across the slide wire and ladder attenuator—and that system is fed from another slide wire marked "Adjust Meter." The actual output of the oscillator system is about two volts; the "Adjust Meter" slide wire is used to cut this down to supply one metered volt to the "Microvolts" slider.

In some types of standard signal generator, the functions of the "Adjust Meter" and "microvolts" slide wire are combined. Instead of adjusting the meter to read one volt by means of the "Adjust Meter" slider, then moving the "Microvolts slider to the desired position, a single slider is used. The voltmeter is then calibrated in "Microvolts"—though reading volts, actually, since it is at the high end of the ladder attenuator—and the meter is adjusted to read, say, 7.0 microvolts, while the multiplier switch is set at X1, to get a final output of 7 microvolts.

The real kingpin, Grade A #1 headache though is the oscillator itself. The source of the radio-frequency energy we split up and toss out as desired. It's not difficult to make an oscillator and tuning condenser with band-switch coils that will oscillate all the way from 100 kilocycles to 30 megacycles—smoothly, with handy overlaps, and with adequate power. The difficulty of spraying really sets in at that oscillator circuit. It radiates. The coils produce high-power, high-frequency magnetic fields. The condenser functions by reason of high-voltage, high-frequency electrostatic fields. The leads that carry those currents are perfectly willing and able to act as small antennas, shooting their power out in all directions. There's a considerable amount of difficulty in throwing out the 999,999 unwanted microvolts in the attenuator—but in the oscillator there may be another 200,000,000 or 300,000,000 microvolts of unwanted stuff. That is—unwanted anywhere but where it's needed.

Somehow that has to be boxed in, tied down, and handcuffed where it belongs. And radio can really say: "Stone walls do not a prison make, nor iron bars a cage." Furthermore, radio laughs at locksmiths, too. Ghosts take lessons from radio-frequency stuff in the matter of getting through walls.

We stopped the radiation tendencies of the various resistors by box-



Combined ultra-high frequency standard signal generator and pulse-modulation generator, covering carrier frequencies from 300 megacycles to 1,000 megacycles. Pulse repetition rates from 50 to 100,000 times a second are available, the pulses lasting from 1 to 50 microseconds.

ing them up in copper; how about a copper shield for the oscillator? Well, it helps some. But the attenuator doesn't mean a thing; the spray through that copper shield, and from various eel-slippery leakages makes a liar out of it. You have the attenuator set at 3.0 microvolts, and the receiving set under test indicates that there's more like 3000 microvolts of signal.

There is. It's coming out along the wires that take the heater current into the oscillator tubes, also riding back down the plate supply lead, like a kid sliding down the bannister and jumping off into space at the end.

So we add a filter system of condensers and inductance coils to block the leakage back along the heater and plate power supply leads, and mount that filter inside the shield too.

That helps. The radiation the receiver now picks up indicates that the "station" being received is no longer of the order of a 50,000 watt major transmitter next door—it's more like a 50,000 watter in the next state.

Now what's radiating? We've shielded the whole oscillator system, filtered and shielded the power leads—

The shield's radiating itself now. It traps the radiating currents from the stuff inside, and the currents set up in its material by that trapping act make it start radiating. The coils are causing most of the trouble, because the magnetic fields there are so hard to stop. Theoretically, when the magnetic field of the coil cuts through—or tries to cut through—the metal of the shield, it induces in the shield a cur-

Interior of the ultra-high frequency generator, with shield cans in place. On the left is the power transformer, rectifiers and filters; the oscillator circuit elements are in the large can at the center. At the right are voltage regulator tubes, and the pulse-generation circuits and modulator tubes.

rent which is short-circuited because the shield is made of copper, an excellent conductor. This short-circuited current itself generates a magnetic field of exactly opposite, and nearly exactly equal strength, which practically blocks the magnetic field inside.

It isn't *exactly* equal, and doesn't *completely* buck it out; if it did, there wouldn't be any field getting through to induce the current that bucks the field. The copper has very little, but still has some, resistance. The currents induced develops enough potential to radiate. Not much, but enough to screw up the data when you're measuring a reasonably weak receiver, let alone a really sensitive job. You won't get very far down your microvolts attentuator before you discover that going down further doesn't reduce the output a bit.

We'll add another shield can, of heavy-gauge copper or aluminum—this time a separate shield can around the coils, since they are, by reason of their magnetic fields, the worst offenders. This time, when we test the rig, you'll find that the attenuator can be moved quite a way down the scale of microvolts before the spray leaking out equals

the official output. But, despite all our precautions, the excess microvolts are still escaping.

Another layer of shielding is called for. But we have to put our standard signal generator in a proper case anyway, so we can simply make the case out of heavy gauge sheet aluminum, thoroughly strapped and grounded together, and make that the final shield. Furthermore, we can build the rectifier system and power supply into that outer case, install radio-frequency traps and filters in the leads that bring the AC power line in, and make the outfit self-contained and really isolated from the outer world.

Now, by the great Lord Harry, the stuff is stopped! Stone walls do not a prison make, but three successive layers of heavy gauge, highly conductive sheet metal should! Try it out and see!

With the microvolt set at zero—our receiver under test responds nicely. Leakage we have still with us. How . . . how in the name of ?

It's the metal shafts from the gang tuning condenser, the Adjust Meter and Microvolt attenuators. Oh, certainly they're "grounded": but so was the inner shield can, and it still radiated. These metal shafts —particularly the gang-tuner shaft —extends, necessarily, through all shield cans to the outer world. Necessarily—but not necessarily metal; we can fix that up by putting a ceramic insulator coupler in the shaft, and breaking the metal path. Then the inner end of the shaft is grounded to the inner shield, the path is broken by a ceramic insulator, and the outer end is grounded to the outer metal shield case. Do the same for the other shafts—Adjust Meter, Microvolts, Range Selector, and Microvolts Multiplier—add a shield can over the back of the voltmeter, and a copper faceplate meter dial, also grounded, and now try the receiver with the output setting at zero-zero. At last! It says no output, and there is no output. The microvolts scale tells the truth!

Hm-m-m—but this Standard Signal Generator is supposed to produce signals reliable in frequency and magnitude. How about the frequency stability? One of the main jobs of the generator is to produce a desired radio frequency; when you set the dial at a selected point, you must get from it what the dial claims.

Confining the radiation and setting up a perfect attenuator system is only good and sensible if you can be certain that what you are confining and what you are measuring is what you want.

Ordinary oscillators tend to drift as they run. Temperature, humidity, and even age have their effects on calibration. Temperature is the worst offender, and changes in temperature are always going on.

With an increase in temperature, the coils tend to expand. Since the inductance of a coil is dependent upon its physical size, expansion due to temperature will lower the resonant frequency of the circuit, thus causing a frequency deviation

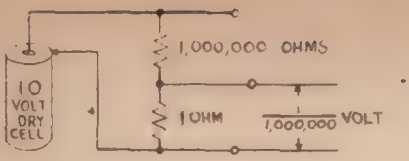


Fig. 1. With a 1.0 volt source, theoretically you could get 0.000001 volt this way.

Fig. 2. But practical voltage dividers use smaller units that can be measured accurately.

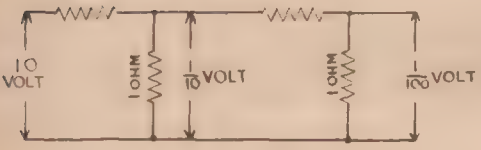


Fig. 3 Then further division of the divided voltage, step by step, leads to 0.01 volt.

from what the dial claims—unless something is done to compensate for the change.

So the coils are wound on forms that do not change but infinitesimally with fairly wide variations in temperature. The oscillator tube is included in the oscillator shield, and the heat from the tube itself tends to create a fairly stable temperature once the generator is permitted to "warm up" for an hour or so.

The condenser is usually so designed that expansion is automatically compensated, therefore it introduces no effects of its own. Since the condenser can be made of various metals, expansion in the stator plates, which would tend to spread them apart and lower the capacity, raising the frequency, are compensated by using a different metal to support the rotor plates. The end-plates and bearings are often treated so that temperature shift is canceled out and at any temperature between fifty or sixty degrees and a hundred and thirty or forty result in no temperature-coefficient at any point on the tuning range of the condenser.

In some cases, temperature compensating condensers are added. These are usually very small condensers—small electrically—which have a definite shift in capacity per degree centigrade. By and large,

however, designing the condenser properly is best. Since the main tuning condenser capacity change is often greater than ten or twelve to one, a fixed temperature coefficient condenser will have greater effect at the low capacity end than at the high end. This, of course, is excellent to control something so that it will not be *too* far off; it is used extensively in home radio receivers, for instance. But this is not good enough for a signal generator, so much engineering goes in to the condenser.

To cite an example, we had a type at one laboratory that was considered good. At any time of the day or night, we could turn the dial to the frequency of any of the local radio broadcasting stations and the error would be less than two hundred cycles. Considering a one megacycle station—1,000kc—which is in the middle of the broadcast band and therefore average, the accuracy is one part in five thousand. This, incidentally is "shift" error, not "setting" error. It is drift from an original setting—we could set the generator up on a broadcasting station and leave it there to run all day and it would not drift more than the two hundred cycles. Setting error is another item—

In order that this excellent frequency stability be practical, the operator must be able to return to a given frequency. The error in tuning, called the "setting" error, must be very small.

Your home receiver may be equipped with an electric eye. It may employ one of the little tricks used by manufacturers in order to cover up the fact that mass-production sets can not be hand-calibrated and exhibit a bit of basic error—that is when you find wide calibration marks and a wide pointer and the station comes in somewhere along the wide spread that such a system permits. And, finally, you do not tune to the number, you tune to the incoming station.

But when the engineer wants to measure the sensitivity at 600 kc, or to set the top frequency of his response at 1750 kc, he wants it exactly that and not almost. He has no magic eye. He has no radio station to tune to resonance. He must rely upon the dial and the dial must be sharp, not shotgun.

A nice long scale is the answer. A scale so long that the average radio listener would get sick and tired of cranking—yes, they use a

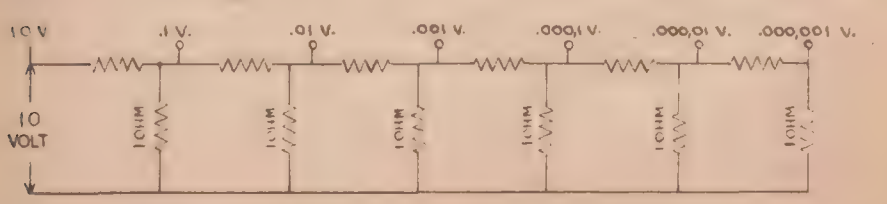


Fig. 4. A ladder attenuator set up so that a tap-switch could pick up one-tenth divisions all the way from 1.0 volts to 0.000001 volt.

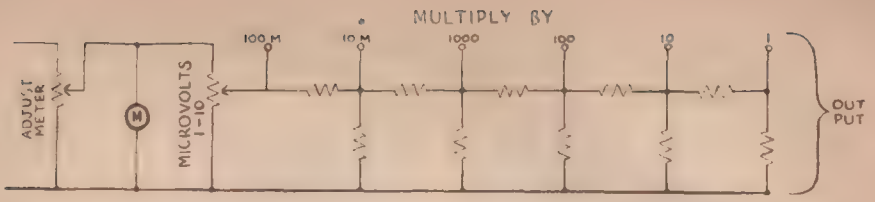


Fig. 5. In Standard Signal Generators, the ladder attenuator is preceded by a slide adjustment. In this "Adjust Meter" type, the meter is set to a predetermined point. Then the second slider will read in microvolts

crank and some even have little motors to turn the dial—the set from one end to the other.

A big worm and gear is used. These are both honed together, and the gear is split, turned halfway, and re-assembled with a set of little springs to take up the slack in fit between it and the worm. The gear ratio is about 72 to 1, and turning the worm just one degree will cause the big gear to shift appropriately.

So a dial is placed on the main condenser shaft, calibrated in major divisions. And the minor divisions are cut in a dial on the shaft of the worm. The resulting scale is effectively about ten feet long, and you can set a knife-edge pointer to a very accurate reset on a ten-foot engraved scale.

The calibration chart, prepared after much testing, says, for instance, that to get 600 kc, the dial should read 157 on Coil D. Turn the range knob to D and start cranking. Eventually you will come to division 1 on the main dial. Then set the minor dial to 57, and the output will be 600kc plus or minus one part in five or ten thousand.

Now for a little complication, again. That sensitivity rating is not as simple as that. Actually, the input is: "—microvolts modulated thirty percent at four hundred cycles." So we need a modulator; something to cause modulation of the oscillator. That means another oscillator—an audio oscillator—in the case. But audio frequencies do not radiate and therefore it is not necessary to go through all of the shielding shenanigans for the modulator. We build a single-frequency oscillator, to operate at four hundred cycles. We take its output, run it through a slide wire labeled "Adjust Modulation" and measure it with a voltmeter so that we can set it to exactly thirty percent. We go a little farther and use a step-by-step switch or marks on the meter to modulate the radio-frequency oscillator at ten, twenty, thirty, and forty percent.

And because we often want to modulate at some other frequency, we offer a pair of plugs marked "Ext Mod" so that you can apply an external modulator and set the thing to any frequency your little heart desires. This is selected by

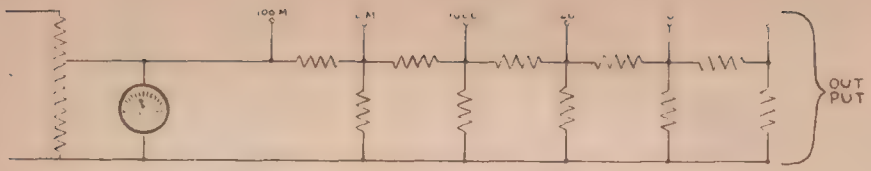


Fig. 6. In other types of Standard Signal Generators, a single slider is used, meter now reading actual voltage applied across the attenuator system input. Output will then be the selected fraction of the meter reading.

a three-position switch labeled "Ext Mod"; "Int Mod"; and "Off Mod" —the latter being if you want to run it without modulation, which is often done in certain tests.

Some types of standard signal generators, particularly those intended for ultrahigh frequency work, are designed with still another type of modulation system. The standard 400 cycle, and a 1000 cycle, as well as external modulation jacks may be built in, but in addition a quite tricky arrangement to generate pulse modulation is included. Pulse modulation practically amounts to turning the power off abruptly—practically instantly—for a certain number of microseconds or milliseconds, then turning it abruptly—again practically instantly—on full power for another specified number of microseconds or milliseconds. It isn't done with a switch; the switch that will turn on and off with the necessary completeness in the necessary fraction of a microsecond hasn't been built. A trick vacuum tube circuit is used. The particular trick and the particular circuit varies with the manufacturer, but it involves an additional series of problems, since the pulse-width—i.e., the number of microseconds the power is on each cycle—and the pulse interval—the number of microseconds between pulses—must be adjustable. The design of the circuit that does that is, actually, a lot more complicated than the design of the radio-frequency oscillator; so far as circuit design goes, an RF oscillator is among the simplest of circuits.

The ultrahigh frequency generators, incidentally, have another type of problem. Frequently, resonant-line tuning systems are used—no coil or condenser is involved, the system being tuned precisely as the dear old familiar trombone is tuned; by varying the length of the plumbing involved. The mechanical system on that job is as neat a nightmare as any of the other features of more ordinary signal generators.

And yet another nasty little menace crops up in the ultrafrequencies. It involves the seemingly nonsensical question "How long is a short circuit?" Unlike "How high is up?" the question has real meaning

that has produced many a heartfelt groan from an engineer. At 300 megacycles, the wave length is down to one meter; at 600 megacycles it is half a meter. Then at 600 meters, 25 centimeters, or about 10 inches, is a half wave length, which means simply that when one end of a 10-inch wire carrying this 600 megacycle current is positive, the other end, being a half-wave distant, will be negative. Which, if you stop to contemplate the matter, means that 10 inches is too long to be a short circuit—or it's too short to be a short circuit! If it were 50 cm., or about 20 inches long, it would be a full wave length long; then when one end was positive, the other would be positive too, and tying that other end to the opposite side of the line would put positive to negative, and be a "short circuit".

All of which reduces to this: simply strapping point A to point B doesn't mean you've grounded it: if A happens to be a half wave length away from B, instead of grounding it, you've simply installed a perfect insulator! In fact, at very high frequencies, where dielectrics don't work well, solid copper bars are the standard insulators; as many a radio ham knows.

There is trouble enough extracting one single, whole and highly elusive microvolt from its 999,999 fellows at broadcast frequencies. Let us be content to say that, at the ultrahigh frequencies contemplated for postwar television, amateur radio, and the proposed "citizens transceivers" the problems are really dillies!

But for broadcast frequencies, at least, we now have a real instrument. With it we can measure a $9.98 midget radio right down to its eyelashes. The Standard Signal Generator with which you measure the $9.98 midget is about three feet long; fourteen inches deep; and fourteen inches high. It weighs slightly less than a box car, and cannot be moved by one man. It operates—usually—on 115 V.A.C., right out of the wall-outlet, taking only about 100 watts.

It costs as much as a reasonably sized, well equipped automobile, somewhere in the neighborhood of $1400.00 complete with calibration chart and a book of instructions, neatly packed in a welter of excelsior and a packing case that could be dropped off of the Empire State Building without fracturing.

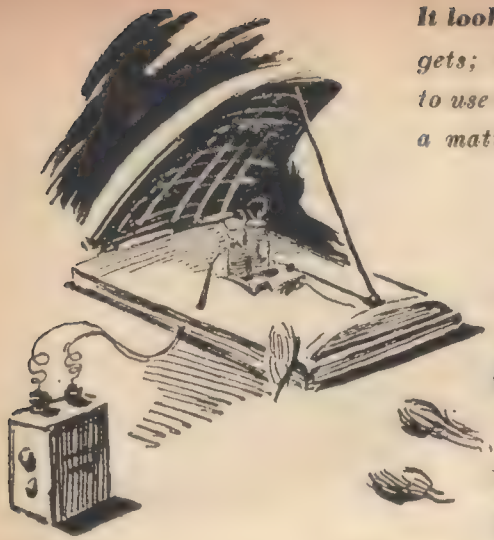
Yes, practically nothing is as expensive as practically nothing.

THE END.

Next Month's Rotogravure section will carry a 11,000-word article on

Solar Prominences

by R. S. Richardson



***It looked** like the ultimate in gadgets; it was whatever you wanted to use at the moment. But it was, as a matter of fact, a deadly sort of semi-living thing!*

Deadly Host

by
RAYMOND F. JONES

Illustrated by Kramer

To Nancy Tyme the white-faced young man didn't look as if he should be selling dime-store gadgets on the street corner. He looked capable and healthy—except for his pallor and a strange tension in his eyes and in his face.

Dan Courtland pushed Nancy, his laboratory technician, towards the rickety little stand where the gadgets were being powdered with snow. He stopped a hundred feet away.

"Recognize that fellow?" Dan whispered.

"No. Wait . . . his face does look familiar."

"It's Bud James."

"Not the fellow that was mixed up in the scandal on the *Queen of Sian?*"

"I'm sure it's he. What a comedown for a man who was the officer and technician that Bud James was. Let's see what he's selling. I want one if it winds up."

They moved to the little table and looked at the gadgets.

"Buy a Dingbat," the pale young man suggested. "Handiest things ever invented."

"Hello, James. You make these yourself?"

The man looked dully at Dan. "Charlie's the name," he said. "Buy a Little Dingbat . . . electropen, wrist watch, pocketphone, pocket radio, billfold . . . all in one."

"Doesn't sound practical," said Dan. "I've built a few gadgets myself, but I wouldn't try to stick a radio in a pen and then try to use it for a watch to boot."

"There's space for a pack of cigarettes," said the salesman. "Buy

one for the lady? Plenty of compact room."

Dan Courtland picked up one. They were shapeless little blobs about four inches long and weighing about a half pound.

The snow filtered down onto Dan's neck and fell lightly on the Little Dingbats. "O.K. I'll be a sucker. Give me a couple. My little nephews can play with them when they go bust."

"They won't break," the pale young man promised.

The snow was coming down harder as they turned away and Nancy fanned it away from her eyes. "Is he really Bud James?"

Dan nodded. "Yes. You can't blame him for trying to hide his identity. I guess no one will ever know if he was at fault or not."

"What happened to him? I never paid any attention to the details."

"Nobody really knows. He was accused of trying to destroy the *Queen of Sian.* As second officer of the ship he gave instructions to dump the fuel and then disabled the communications and tried to turn the ship into space. Those were the charges. Bud James made no defense except to deny them. The evidence was weak against him, and so he got off with a discharge from Transspace, but without any criminal conviction."

"But he's blackballed with every space operator?"

Dan nodded. "That must be what's hard for the poor devil. He can never go back to space. And selling toys on the street corner—" Dan shook his head in sympathy.

"Well, it's time we were getting back," said Nancy. "You have a class to teach yet this afternoon, professor."

"Slave driver," said Dan. "I wasn't born to tend that brooderful of dimwits. I'm an inventor—but I wish I was as good as the guy who invented this combination washing machine, street car, and fire truck, providing it works. Wonder if it actually gives the time."

He took one of the Dingbats out of his pocket. A large, delicately figured watch face showed him the time.

"That's funny," he muttered. "I'd swear that didn't have a watch face on it before. It must have a snap cover that slid back as I took it out. But you're right about the time. I can't monkey with this now. Let's go."

During class, Nancy quietly and efficiently managed the vast amount of demonstration equipment that Dan used. Apart from his teaching, Dan Courtland was a spare-time inventor. He devised dime-store gadgets and thingamajigs and thereby made more than his meager professorial salary. Actually, his gadget-inventing was his profession and his professorship was his hobby.

That didn't keep him from being the most valuable research physicist in mechanics that North State College had.

As soon as class was over, Dan took the Little Dingbat into the lab behind the classroom and put it on a bench. He sat down and looked at it. From one angle it seemed

to be cubical and gray. From another it seemed round and slightly green. Dan turned it around. It looked more like a flat disk from this side.

He got a screwdriver and tapped the case. There was no seam anywhere. And now he couldn't find the catch that would release the panel over the watch dial.

As for writing with the thing—

He laughed to himself. Combination pen and watch and portable radio! Then he sobered and wondered again momentarily at the queer circumstances that set Bud James down from a berth on the *Queen of Sian* to a street-corner stand selling gadgets.

He picked up the Dingbat as if it were an electropen, and then he saw that the corner that had been turned away from him actually did contain a point. But why hadn't he seen it when that side had been facing him? He turned the Dingbat over and it fitted comfortably into his hand. It wrote smoothly and more rapidly than any other he had ever used.

"Works, huh?" Nancy was kibitzing over his shoulder.

"Yes—" Dan nodded slowly. "This thing is a little wonder. I don't see how he sells them for a dollar and a half. Now where the devil is that pen point?"

He had laid the Dingbat on the table and the pen end seemed to have disappeared. "That's about the neatest bit of collapsing mechanism I ever saw. Hand me that knife, Nancy. I want to see if this stuff can be cut."

It couldn't. Dan whittled and hacked. The knife slid off the shiny smooth surface that seemed to shift even as he brought the blade to bear on it.

He put the knife down and carried the Dingbat over to the bandsaw. The blade squealed as he brought the Dingbat against it. Not even a mark was made upon the surface, but the saw teeth were soon dulled.

"If it's that hard, it ought to be easy to crack with the right stress."

Nancy followed him over to an eight-ton hydraulic press. "You can't have mine when that one is pressed out like a fried egg," said Nancy. "I warn you."

Dan grinned. "You might let me borrow it for a little while, though, huh?" He put the pressure on.

The needle on the indicator mounted. One ton, two, three—

"It's bending a little," said Nancy. "You'd better ease up on it."

"Please," said a voice. "Here's your dollar and a half."

Dan whirled about. "Bud James! How did you get here?"

"The name's Charlie. They're patented. You can't monkey with them."

"All right, the name's Charlie," said Dan. "But there's no patent notice on the Dingbat."

"It's stamped on the outside. Please look." There was a sudden urgency in his voice.

With an irritated gesture, Dan released the pressure and took out the Dingbat. He knew there had been no patent notice before, but

there was one now. Pat. AY5-345,-902.

"How did you know that I would open it up? I'm not going to steal the thing. Since it's patented I can get a copy of the patent and read it."

"That would be best. Please get a copy of the patent. I recognized you after you left today. I knew your reputation and that you would open the Dingbat if you could. I must ask you not to because I don't wish to bring suit for infringement."

"There's no infringement if I merely take the thing apart."

"If you do that, you'll put it back together. Please give it to me now. I'll refund your money."

Dan suddenly capitulated. "O.K. But I'll be around to buy another one after I read over the patent."

Without answer, Bud James took up the Dingbat and disappeared through the doorway.

"How do you like that?" said Dan slowly. "Now, how did he know I was taking the thing apart?"

"Just the same you aren't going to take mine apart. I like it," said Nancy.

"Why do you suppose I let him have mine? Where'd you put the other one?"

"You can't have it!" Nancy ran back into the lab and Dan raced after her.

She squealed as he caught up with her. She was looking at the lab demonstration bench in dismay. "It's gone. He must have picked that one up too."

"And he only gave me back the buck and a half!"

"All right, now go down and try to talk him into selling you some others because I want one."

"What's burning in here?"

Nancy sniffed. "You, I'd say, if it didn't smell like transformer oil. It is! This transformer is about to burn up!"

She put her hand on a 10 kva power supply unit that powered some of the demonstration apparatus. She jerked her hand away in pain. "I forgot and left the primary switch on, but there's no load. The secondary must be grounded somewhere."

"And there's your Dingbat on top of it. The janitor must have come in and put it up there when he cleaned."

Dan took it down. "Feels like it's cooked."

By the time they had reached the ground floor of the building, Nancy had surrendered to the extent of allowing Dan to borrow the Dingbat over night. She never expected to see it in working order again.

They got into Dan's second-hand Motorless and he flipped the starting switch. The converter coils rattled in their mountings.

"Perhaps I'll make it quicker walking," said Nancy.

"I think I'll go back to the old gas burners. These babies grind and groan forever before they get up to running voltage."

Indeed, the little car was grunting and groaning. The starting coils whined at their natural frequency. Finally, the cutout switch flipped over and signaled that the car was in a running mood.

"At last," said Nancy.

"In your old age you can recall with nostalgia how you used to ride with the great Dan Courtland whom you knew when."

"Yes, when. Is this thing going or not?"

Dan slowed and switched back to start. The little Motorless grunted.

"She's never acted this bad before. Maybe I ought to work on her tonight instead of the Dingbat. I mean—"

"I *know* what you mean."

Dan finally got Nancy home and talked her out of going to a show. He persuaded her that it was a good night to put her ham rig on the air. Nancy had long ago resigned herself to the life she would lead as a gadgeteer's wife, and she told herself that these experiences were good practice.

As soon as Dan got in the house he took the Dingbat down to his basement laboratory. He gave up the thoughts of opening the case with any of the tools at hand. But there was one thing yet that he had not tried.

He turned away to an adjoining bench and prepared some boiling aqua regia then turned back to the bench where he had left the Dingbat. He stared in disbelief.

The Dingbat wasn't there.

Dan set the flask down and looked on the floor. He moved the heavy bench out from the wall. He swore not too softly.

"You won't find it. It's gone," said a voice behind him.

Dan whirled. There was Bud James. Deep lines were in his face and his eyes were haggard-looking.

"Let's have it. From the beginning," said Dan. "I want to know what this is all about."

The man sat down slowly as if in great weariness of body and mind. "You guessed my name all right. I was hoping that you would go farther than that, but I guess I can't blame you."

"For what?"

"For not opening up one of the Dingbats. I tried to show you in every way I could. I even put the one on top of the transformer in your laboratory, and turned the power on. But I suppose you didn't see the significance of it."

"You're being very mysterious," said Dan. "I don't see the significance of anything. Especially why you wouldn't admit your name before, and now you say you were hoping I'd do more than identify you correctly. And I don't understand about the Dingbats."

"You know about Sian?"

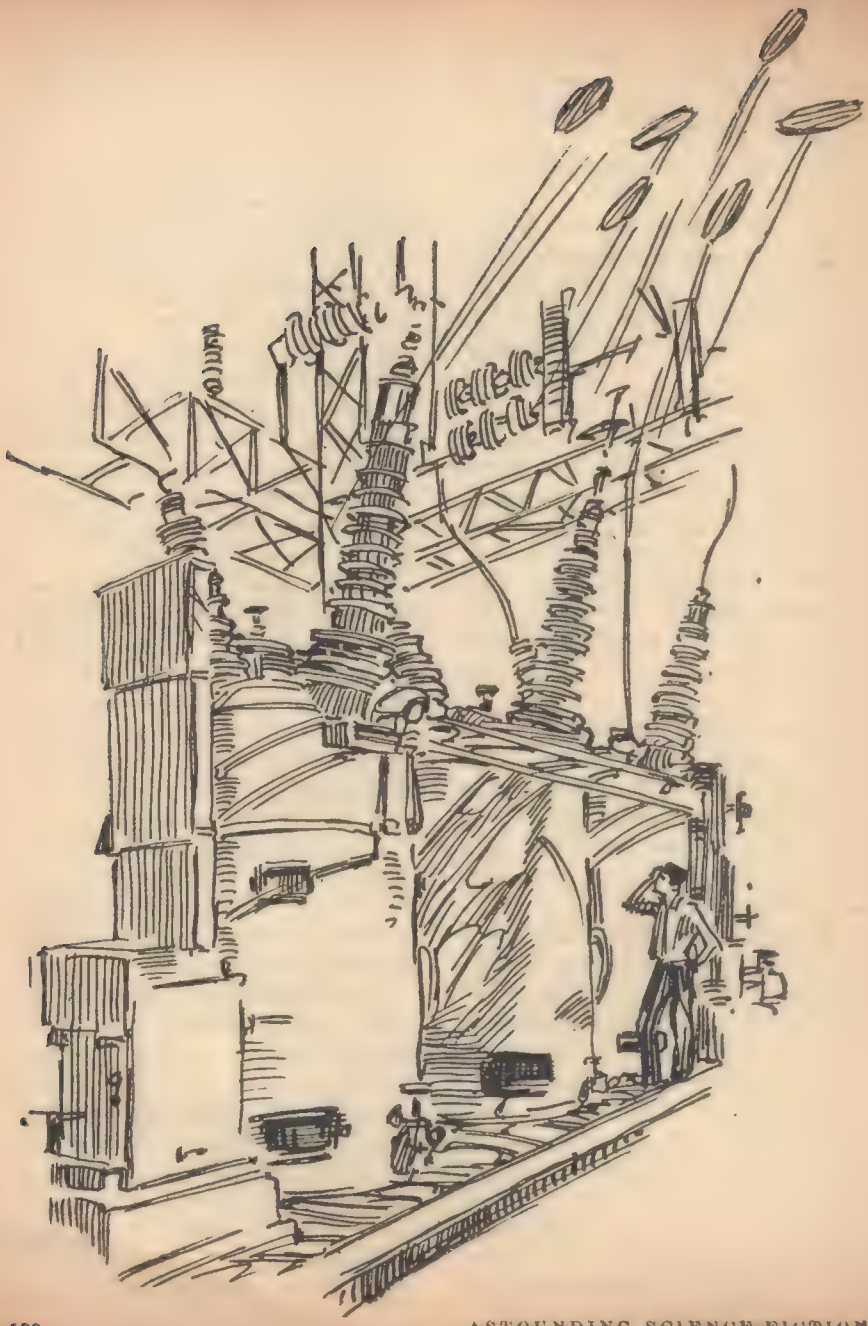
"The mechanical world? Practically nothing. Except that it's a gadgeteer's heaven. Poor college profs don't make enough to take such trips, you know."

"The Dingbats came from there."

Dan nodded slowly. "I should have guessed it . . . but what are they?"

Bud James didn't answer the question immediately. "Sian is a dream world," he said. "It is hard even now to find anyone who hasn't been there who will believe that Sian can exist.

"Historians have tried to prove



that the Sianese are the results of a civilization conquered by the robots it built to serve it. No one knows any facts that are really certain except that Sianese history goes back about sixty thousand years and stops abruptly. No petering out. Just stops.

"The Sianese themselves are completely mechanical. Brains, appendages, and all: No one has ever seen anything of the insides of one. We know only that they exist. They wear out or die. And they reproduce by a method of group construction. I am the only man who has ever observed the process. I was able to see once how eight of them gathered around a workbench and took enough parts out of themselves to assemble a ninth creature that joined them apparently as intelligent and able as themselves. I believe that certain specialized mechanisms within the Sianese are constantly producing these parts used in assembling others."

"And so?" said Dan.

"On Sian there are life forms of metal that are as different from each other as are the life forms of Earth. There are animals there, and insects, and even a peculiar sort of thing that is almost plantlike."

Bud stopped and Dan kept looking at him. "Keep going."

"The Dingbats," said Bud, "are insects of Sian."

"Insects!"

"Right. Mechanical insects, a particularly deadly breed. The Sianese try to exterminate them with little radiation guns just like we spray flies."

"But what harm can they do—even there? And how can they bother us?"

"These particular insects are parasites. They require a host as do all parasites. It is impossible for them to exist very long away from a suitable host."

"But surely they can't find sustenance from any host that is available on Earth!" exclaimed Dan.

"Reflect a moment. What kind of a host do you think these mechanical insects would require, having come from such a planet as Sian?"

"Obviously it couldn't be any form of life as we know it."

"Obviously."

"And there is no other form of life on Earth."

"Nothing that the Little Dingbats might interpret as familiar life?" said Bud.

"No. Of course not—" Then Dan sat very still and said, "I see. Yeah. I get it now. No wonder you made no defense at your trial. They'd have declared you insane."

He saw it again in his mind. The Little Dingbat on top of the overheated transformer—sucking electronic energy out of the coils like a leech sucking at a blood vessel. And in the little Motorless. No wonder it had moved with reluctance. The Dingbat on the seat had no doubt been sucking out the energy of the converters as fast as they made it available.

"I saw what the Little Dingbat did to one of my transformers and to my car," Dan continued.

"Get the picture, then," said Bud grimly. "Hundreds of millions of them hiding all over the planet sucking the energy out of our power generators, draining the lifeblood of a mechanized planet."

"But there aren't that many, surely."

"Not yet. But their rate of reproduction makes a guinea pig look sterile."

"How—?"

"They convert energy directly into matter. By a process of group assembly they create new individuals as the Sianese do."

"But surely they can't be much of a menace," said Dan. "If they're strictly mechanical, it ought to be easy enough to destroy them."

"Good. Exactly how are you going to proceed?"

Dan didn't miss the sarcasm and bitterness in Bud's voice. He said, "First I'd like to know why you took to selling the things on the street. Why didn't you destroy them instead of peddling them?"

"I have spent a good deal of time on Sian. I have made a study of the planet—as a hobby. But in some ways I have been more fortunate that the scientists who have studied professionally. I am sure that I am the only one who has ever identified the Dingbats as parasites. Such a theory would be laughed at right now by the eminent doctors of ethnology who have published tomes on Sian.

"When the *Queen of Sian* had mechanical trouble soon after taking off it wasn't too difficult to find the source of the difficulty. But I knew it was hopeless to try to track down all the Dingbats that had gotten aboard. And I knew what would happen if even one got to Earth. So I did the obvious thing."

"And they clapped you in the brig before you finished?"

"Yes. It was a wild, fool thing to do, but I could see no other course. I still can't. The only reason I believe I escaped conviction is that perhaps Captain Knowles also knows about them. He didn't believe at the time that they were as dangerous as they seemed. Afterwards, he became scared and assisted my defense. He's both a coward and a fool, but he saved my neck as far as I can guess."

"But selling them?"

"They have a degree of intelligence. Because I was familiar with some features of Sianese culture I managed communication with them. I told them I'd lead them to choice sources of power on Earth if they'd stick together and do as I said. My problem then was to get them into the hands of someone capable of analyzing them. If I had made one false move, they would have bolted. I said that by distributing them as I was doing they would become familiar with Earth ways and it would help them. They swallowed it—for a while. When you started working on the one he yelled for help and I had to come to keep the rest from rebelling. But I turned your transformer on and put the other Dingbat on top of it. You might have caught on, but your dipping this one tonight in acid was too much. They

bolted. Now they're gone. In the city they are beginning to breed like flies. In a week they'll have the place paralyzed for want of power. They can double their numbers every week."

"Why can't we find out what the Sianese do and use the same?"

"The Sianese won't co-operate that much. More than that, their own dope is not very effective. They've been trying to eradicate the Dingbats for centuries. They barely hold them in check."

"I wonder how long it will take before the town notices the effects of their presence."

"They should make themselves felt about tomorrow morning," Bud prophesied. "You'll see."

Bud was extremely conservative in his time estimate for at that moment Jackson J. Calvert, Mayor of Clarendon, was climbing into his Motorless. It was a slick, new hundred and eighty horsepower job. But what the mayor didn't know was that four of the Little Dingbats were settled nicely under the hood over the converter coils, waiting for him to start up.

The mayor switched on the starting coils. Instantly, the Little Dingbats opened their circuits and seized upon the field until the coils of the Motorless groaned and vibrated in their mounts. Their overloaded windings smoked with the acrid fumes of burned insulation.

Mayor Calvert swore and fumbled with the switch. The coils rattled and smoked again and finally gave up. The four Little Dingbats silently dropped out and rolled away. The mayor took up fuming where the Motorless had left off.

At Power Dispenser Station No. 7 Frank Waterson came on the graveyard shift and looked over the log of the previous shift.

"Been having trouble?" he asked.

"Yeah. Number ten transmitter is wobbling all over the place tonight. Can't figure it out. Acts as if something had happened to the load end, but I can't see anything wrong. I shut down at seven and changed bottles. No change resulted. And I forgot to log it. Will you? I'm ready for the hay."

"Yeah, sure," said Frank. "If it keeps up, I'm going cut it out of the circuit. No need of it this time of night."

"You'll need it by morning. See if you can do something."

By morning Frank Waterson was exhausted and frantic. Eight of the units were out of commission with overloaded and burned out circuits.

In Clarendon that morning, Motorless cars could not be made to function. Hundreds of workers walked to jobs, and hundreds more didn't get there. Lighting and heating converters either failed completely or overloaded the dispenser stations so badly that they were ineffective.

Mayor Calvert called Superintendent Rockwood of the power company and raised the devil. The super raised more of the devil with his chief operators. The chiefs passed the buck on down.

But it was not until late that afternoon that they realized it was not

a little matter that could be fixed by firing a few operators and tinkering with the equipment. It was not until then that they discovered that the condition was not merely local.

Since the power output of Clarendon was insufficient for all of them, many of the parasites were forced to go elsewhere. They moved eight miles away to Glidden and attacked power sources there. Clarendon heard about it in the evening and the news unnerved the citizens of both towns. It was a chilling prospect to know that they would have to retire that night with the communities virtually powerless.

It was an even more chilling phenomenon in the pale gray daylight of the following morning. Fall weather was coming along and hot water and heated apartments were necessities of life. There was talk about bringing in some outside technicians and finally the outsiders were called. They didn't improve the situation any.

Mayor Calvert called Dan Courtland on his own initiative.

"Dan—this is Calvert. Yeah, I'm fine. Say, I'm worried. It's about this power shortage. I'm afraid of it. There's something funny about the whole business. I want you to do something about it."

Dan hesitated a moment, then he said, "We can tell you something about it. I'd like you to come up right away."

When the mayor came into the laboratory later in the morning he recognized Bud instantly. He glowered and stiffened his back. "What's *he* doing here?" he demanded of Dan.

"Bud is the one man who could have prevented this whole thing."

"I seem to remember he was charged with very serious crimes and was acquitted under circumstances not too favorable to his reputation."

"It was the liner, *Queen of Sian,* that brought the source of these power difficulties to Earth," said Dan quietly. "It was an attempt to prevent this that got Bud into difficulty."

"What's it all about?" said Mayor Calvert.

Briefly, then, Dan told him. Calvert had great faith in Dan's knowledge, but this sort of thing was almost beyond the limits of his credibility.

"Mechanical parasites! Sucking on engines like worms on a tree trunk—how do you think you'll ever make anyone believe that? I'm willing to take your word for it, but I know you. What's to be done about it?"

"We don't expect to convince anyone else of it," said Dan. "We know what kind of panic reaction that would result in. And there's not time to try to argue other scientists into accepting the facts. We've made our initial plans. Others are going to have to find out about the parasites the hard way. We want their discovery to be accidental and spontaneous, but, in the meantime, we want to catch one for examination. And that's not going to be easy. That's why I called you up here. Will you help?"

"How? What are they like?"

"They're about four inches long, mostly gray, generally oval in shape. You can get the police, firemen, power operators, and anyone else you can think of to begin searching for them. Better call it a rat hunt. One of them in motion will look enough like a rat. Let them think you're crazy, but get traps of all kinds laid out. Spring traps, water traps, anything that will catch a good-sized rat ought to catch one of these things. Bait them with a small battery. You *will* be called crazy for that, but we've got to have one."

Calvert agreed dubiously. He knew the reaction to such a rat extermination program in the midst of the power crisis—and in a campaign year at that. He could write off his political career as finished. But he trusted Dan.

There was literally nothing to be done towards a solution by those who understood the real cause of the trouble. It was an unnerving, waiting game that Dan and Bud had decided on, and one not entirely favorable to Bud. But he realized the correctness in Dan's estimate of the reaction of both the public and scientists to the truth unless a parasite were actually produced as evidence.

Nancy Tyme did not underestimate the seriousness of the problem, but she couldn't stand the mere waiting. An inveterate radio ham, she made it appear as if she were more disturbed about the interruption to her ham activities than anything else. She finally succeeded in rigging up an auxiliary power supply from a gas engine and a small generator that she found kicking around the college attic.

The day following, she reported happily to Bud and Dan that she had QSO'd Rangoon on the makeshift power supply.

"How about doing the same to a Dingbat?" Dan said sourly.

"If you'll be civil, I'll tell you how to do just that."

"Sorry. Got any ideas?"

"Yes. Why not poison them?"

Bud looked blank. Dan scowled. "How can you poison them when they don't eat?"

"Sure they eat—power. That's what's causing all the trouble."

"Say," Dan's eyes lighted, "you've got something there. How about it, Bud?"

"I can see that certain types of

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power might act as a sort of poison, perhaps, but I can't see what good it's going to do us at the moment."

"Isn't it true that in the organic world at least there is generally only one specific host for a given parasite?"

Bud nodded.

"Then assume the same is true here. So far these things have attacked chiefly power dispenser stations and receivers. I think they have shown that this is not their accustomed type of host because they are putting the stations out of commission. In the ideal parasite-host relationship the parasite does not destroy the host because that would mean the eventual destruction of the parasite. I think it's evidence that the Dingbats are in highly unfamiliar territory. Whether they become adapted or not is another question.

"But now suppose that some form of power supply is a host that will not support them. It may even kill them. In any event, we should expect to find such power sources avoided by the Dingbats. I suggest that we make a very careful survey to see if any types of power generators are being avoided by the parasites, as well as looking for dead ones who might have attacked pathogenic hosts."

Bud nodded approvingly. "That sounds like a good lead."

Since it had been determined that the parasites thrived on electromagnetic radiation at power frequencies, it was planned to set up oscillators that would cover the known bands from one kilocycle up to a hundred angstroms. Superintendent Rockwood of the power company was grateful for Dan's assistance. He readily agreed to the installation of the high-powered oscillators.

"It sounds like you may know something about this," he said, "but you'll have to move a dozen rat traps to get your stuff in the plant. I suppose you know about Calvert's crazy rat extermination program."

"Yes, I'd heard of it," said Dan. "Caught anything yet?"

"Of course not! There aren't any rats around here."

"I'm setting up individual engine-driven generators for these oscillators and I want your operators to watch them carefully to see that the same thing doesn't happen to them as has happened to the other equipment."

"I'll do anything," promised Rockwood. "I only hope you've got some lead on this thing. It's driving the whole town crazy."

It seemed incredible that some of the parasites were not seen eventually when there were dozens around each power station. Over a thousand had come to Earth on the *Queen of Sian*. Bud estimated that there were at least a hundred thousand in existence now. He explained their ease of escaping.

"They're adaptable," he said. "That's the main reason I'm dubious about our having any luck in finding them unable to use any power supply as a host. But anyway, you saw their adaptability that I exploited in getting them to become the Little Dingbats. They can do

other things equally as well. They can hide in the walls of the power stations and scurry from detection like rats. They can become highly efficient boring machines at will and go through the Earth at a dozen yards a minute. They'll never let themselves be found. We could blast away an entire power station, but the Dingbats would be gone before the sound of the blast died away. We'll never see a live one."

Dan was beginning to agree. The trapping plan had produced no results. After a week he told Calvert to abandon it. The Dingbats were too wary to be caught that way. And there was evidence that they could easily bore their way out of any trap that could be devised.

It went back exclusively to a waiting game. Waiting for a dead parasite to be found, waiting to discover a pattern of avoided power sources, waiting to see if the oscillators happened on a frequency of radiation inimical to the parasites.

Constantly, the parasites spread. They hid in the walls and floors of buildings and in the very ground beneath the power stations. Hiding, they silently drained away the power of the cities. Not only Clarendon and Glidden. They were spreading swiftly now. Reports showed them twenty, fifty, and then a hundred miles away.

Five hundred miles radius from Clarendon encompassed a huge industrial area of steel mills and mines and great manufacturing plants. When these began to fail, panic broke out.

Technicians from foreign countries and even from foreign planets were called in. Always it was the same. No defects were apparent in the power supply equipment. Merely that draining away as if some unseen load were shorting out the supply. Transformers heating up, burning out. Motors dying, their windings scorched.

And then came the first air tragedy. A liner with two hundred aboard fell from a height of three hundred feet just after take-off. It was apparent that a parasite had been aboard and had drained the energy as it began to appear in the motors. With insufficient flying speed to prevent the stall, the great ship crashed, killing three fourths of those aboard.

When they heard about it, Dan said, "This is what I've been afraid of. I'm afraid we're working ourselves into a hole. When the facts do become known, it won't be healthy for us to admit that we knew all along what the trouble was. Our charts don't show any specific type of power source that's being avoided. We haven't been able to find a Dingbat either dead or alive. I think we'll have to admit we're licked and get some help somewhere."

Bud agreed. "I was hoping that you wouldn't come to that conclusion, too. Do you have any ideas who to call in, or how to proceed?"

"No. That's why I mentioned it to you."

"Let's go to Captain Knowles then and force him to tell what he knows of this. I'm sure he knows something by the way he acted at

my trial. His statement that the parasites were brought from Sian on his ship would go far to break the ice."

"It might ruin Transspace."

"I wouldn't feel too badly about that."

"O.K. Go ahead. But Knowles may be on a run. Check him up, anyway."

When Bud was gone, Dan stared morosely out of the laboratory window. The greatest problem he would ever have to work on, he reflected, and not a single bit of experimental data to make a beginning.

His introspection was interrupted by the flurry of heel tappings coming through the classroom into the laboratory. It was Nancy.

"I've got one! I've got one!" she squealed in excitement.

"Got one what—?" Then Dan's jaw hung slack. He stared at the Little Dingbat that Nancy held in her hand.

"It's dead," she said.

"How did you kill it?"

"I didn't. I just found it curled up in the tank coil of my rig. I wondered why I wasn't getting out last night, but I didn't see this thing there then."

Dan took it from her. Instinctively, he knew it was dead. It felt different in his hand—as if some quality had gone out of it. Some strange life quality.

He felt as if some great smothering blanket had been lifted from him. "This is the thing we've needed. Now, we can go ahead and find out something to work on. We've got to find what killed it. What frequency were you working on last night?"

"Seven megacycles."

"Way down in the mud, huh? I wonder—" He scanned the reports from Rockwood. "All of the oscillators have gone through that frequency and nothing has happened that we know of. We will bring them all back to seven megacycles and let them run overnight."

He sent a request to Rockwood to have his men set the frequency of the oscillators, then he and Nancy turned their attention to the dead parasite.

"Figured out how to open it?" Nancy asked.

"I was ready to try boiling aqua regia when the specimen ran out on me before. I think I'll try that, first."

He prepared the acid solution, then slowly dipped the Dingbat into it. He repeated the dipping and held it longer. Not a sign of chemical reaction showed. He let it stay then for a half hour.

"It looks like the hydraulic press," said Dan. "I hate to do that. It might smash up the insides."

"Why not heat it and cool it quickly?"

"Sounds like a good idea. Only heating it might damage it, too. But we can keep it at normal room temperature initially and dump some liquid hydrogen on it. There's some in the next laboratory."

They placed the parasite inside the cold lock with its tremendously thick walls that were built to withstand the pressure of the boiling

hydrogen. Dan tripped the valve and the space-cold liquid engulfed the shell of the parasite. Gigantic strains were instantly set up in the layers of molecules forming the stuff.

And it failed under the strain. A thousand minute cracks appeared, then a single large one laid the shell open from end to end.

When they could open the lock at last, Dan and Nancy peered eagerly at the parasite.

"It's broken!" Nancy exclaimed.

Dan's reaction was beyond the stage of exclamation. He simply stared as he bent over the crucible of the lock.

The innards of the parasite were like lace, fairy lace that could be blown away with a breath of air. But Dan sensed, rather than saw, that the lace was composed of hundreds of thousands of infinitesimal electrodes, lenses, converting tubes and gear trains.

"We can't touch that," he said slowly. And even as he spoke a shard of the shattered case fell down onto the lacy maze and oscillated on that delicate bed. Dan let it remain. Only tweezers under a microscope could be used to remove the splinters of the case from amidst the internal organs or machinery of the parasite.

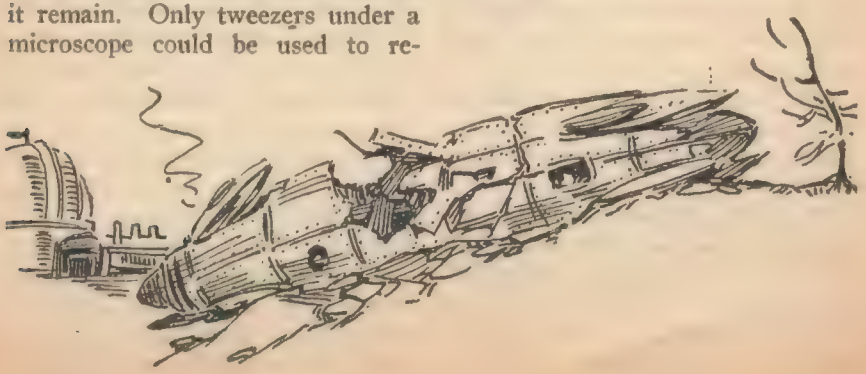
"We'll have to examine it right where it is," he said.

He brought over a powerful spotlight on a stand and then rigged up a support for a 5000X microscope so that it could be swung close to the shattered parasite.

At last the set-up was ready and he slowly lowered the microscope barrel and brought a portion of the lacework into focus. It exploded suddenly into a vast power plant whose intricacy was beyond comprehension. There were giant generators that were apparently fed from massive collector units. These were the only things Dan could even vaguely identify. Everywhere, neat ropes of cable strung between the massive components. Giant, transparent tubes with a complex maze of elements dotted the structure like nerve ganglia.

Dan abandoned his original plan to sketch the details. He spoke to Nancy. "Feel like working all night?"

"Why?"



"We'll have to photograph this thing and dissect it as we go along. I don't dare leave it. Some parts are smashed beyond hope of recognition now. Perhaps we may be able to dissect out units and reconstruct them under the microscope."

Nancy agreed. By morning they had three hundred photomicrographs and the parasite was a dismembered mass. Small units were mounted on slides for further study and Dan had attempted to catalogue and index the delicate assemblies as they were removed so that their original relationship might be recalled.

As the sunlight broke into the laboratory, Dan brushed back the hair from his forehead and sank down in a chair. "We know everything now except how these things go and what killed this one. I wish Bud hadn't left. He might have been helpful."

After Dan and Nancy had knocked off for a little sleep and had returned to the laboratory for the reports from Rockwood, Bud put in a call. His voice sounded full of excitement over the line.

"I've got results," he said. "How about you?"

"We've got plenty, too," Dan replied. He quickly related what had been learned from their dissection of the parasite.

"Good," said Bud. "I've arranged to get some live ones for study in case that seven megacycle business doesn't do it."

"How?"

"I told the whole story and some of the directors got scared. They called Knowles and made him come through. He knows, all right, and he got scared too. The whole thing fell apart then, and they decided to corral some more parasites for test. They chartered the whole boat just for that purpose. Apparently the Sianese don't have to co-operate. The bugs jump aboard whenever they get a chance. Knowles said it happened once before and they managed to get the parasite off before leaving. What do we do now?"

"Come back and help me analyze this thing," said Dan. "You've done a good job. We'll wait for the live parasites and see if this seven megacycle radiation does any good."

Dan persisted in his belief that the public shouldn't be told yet about the parasites. He knew the kind of panic that would result, the fantastic horror stories of "foreign invaders."

Throughout the day he waited anxiously for some sign that the seven megacycle oscillators were having effect. In the afternoon he and Nancy visited some of the power plants. They checked the frequency and power output of the oscillators. Everything was working correctly. They searched the grounds and buildings, but there was not a sign of a parasite alive or dead, and still the meager power being generated was held down by the sucking of the creatures.

"It looks like a false trail again," Dan admitted as they left the last station. "I pinned great hopes on this working out."

"I wonder if the parasite died

from natural causes?" said Nancy.

"I suppose it's possible. Bud said the Sianese themselves wear out or die. Well, as soon as the live parasites arrive for tests I'm going to call a conference of some of the scientists I think are stable enough to handle the problem. It's far more than Bud and I can handle."

He gave a cursory check of the latest reports when he got back to the laboratory. They showed no discrimination whatever against any type of power source by the parasites. All kinds of generators were being attacked with equal ferocity.

As to the news, it was serious enough, and Dan wished he could ignore that. It didn't help to realize the extent of the catastrophe.

New centers of disturbance were constantly springing up now. The parasites were obviously being transported by trains and aircraft which they somehow didn't destroy. Perhaps they were succeeding in adapting themselves to the new hosts so that they would not be destroyed themselves. But there were still plenty of wrecks and crashes.

And other tragedies had arisen, too. Riots, fires, and mob violence centered in those communities where man-made electrical and mechanical energy was reduced to a minimum. Dan knew the breaking point was close at hand. He prepared the list of scientists he would contact.

Bud came in late. He brought a letter up from the office for Nancy.

"They asked me to bring this up to you," he said. He turned to Dan. "And now what's on the program?"

Nancy gave a short exclamation of disgust. "This is a QSL card from that gal in Rangoon. Listen to this: 'Were you lousing up the ether! You came in about R2. What kind of baling wire rig have you got?' The nerve of her!"

"Maybe you need a good mechanic to go over your rig," said Dan.

"Oh!" Nancy's face flamed. "It was just my buffer. I had rewired it that day and I got some feedback into the oscillator. But it was that Dingbat that was giving me the R2. I should have come in at least R4."

Dan was not listening to her burst, but the very words seemed to hang in the air after she stopped speaking and they clamored for his attention.

"Feedback, did you say!" He straightened and stared at her "Why didn't you tell me?"

Bud suddenly caught it, too. He whirled and looked at her.

"What's the matter with you two?" Nancy said. "Is a little feedback so poisonous?"

"It may be," said Dan, "— to the parasites. Come on, we're going over and look at that rig of yours and Heaven help you if you can't connect it *exactly* the way you had it that night."

"But I don't understand!"

"You will. Come on."

For an hour Nancy sweated over the buffer stage of her amateur transmitter trying to reconstruct it exactly as it had been before. At last she had it. "There it is. Now tell me what you want with it."

Dan didn't answer. He had been busy rigging up connections to a scope, and now he started the transmitter and looked at the picture of the carrier wave.

"Boy, oh boy, is that pretty! You wouldn't think it was possible accidentally."

The wave shifted and wobbled back and forth along the time axis of the scope.

"That may be our answer," said Dan, "frequency modulation. We assumed it was simply a pure sine wave of constant frequency at seven megacycles that was deadly to the parasite. And that wasn't even what you were putting out when that one died in your set."

Nancy looked at the scope in fascination. "That would probably sound pretty good on an FM receiver."

Dan checked the swing and found it was about nine kilocycles at a modulation frequency of one kilocycle. "Now, we can make our oscillators *exactly* like this," he said. "If it turns out that frequency modulation of a seven megacycle carrier with a nine kilocycle swing is the only thing poisonous to the parasites, I think we'll never really know how much the laws of probability have been working on our side. It might have taken years to find that combination and use it against them."

Bud nodded. "Years ago there used to be some narrow band FM in those low frequencies, but it was practically useless, and it wouldn't happen except by accident."

They hurried to the nearest power station. Rockwood was there pacing the floor in despair. "Something new?" he asked.

"We think so," said Dan. "We're going to revamp this oscillator. I wonder if you could give a little help here?"

It was actually the work of only a few miutes to change the oscillator so as to introduce a small amount of frequency modulation, but it seemed like hours.

When they were finished, Dan threw the switch and they waited tensely. There was nothing—at first.

Then they felt it rather than heard it. There was a rattle and tumbling as parasites died and lost their hold on the interior of the walls and fell to the floors. And above it all, there seemed a high scream of pain and despair as from a hundred metallic throats. It was so high that it was more like a forgotten memory than an actual sound, and none of them were ever sure afterwards if they heard it or not.

"That's it," said Bud. "Can you get the rest of those oscillators changed over tonight?"

Rockwood was too dazed almost to realize what had happened. The power output meters of the dispenser had shot up to normal and the tubes glowed brightly. "We'll have them all done by midnight," he promised.

On the way back to the laboratory, however, Dan was more morose than ever. Bud asked him what was wrong.

"Don't you realize," said Dan, "that the entire Earth has got to be

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sprayed almost simultaneously with this radiation in order to wipe out the parasites? That's a gigantic job in itself. There's no commercial equipment designed for that kind of operation. There are only the hams below thirty megacycles, and only those above forty megacycles are equipped for FM transmission."

"But it looks like the only way," said Bud. "And it's far better than nothing at all."

"What are you worrying about?" said Nancy. "It will be taken care of within twenty-four hours."

"What are you talking about?" said Dan.

"The hams. There're over a million of them, and they are distributed in all parts of the world. It will be a simple matter for most of them to transmit on seven megacycles and put out with that small amount of FM."

Bud's eyes lighted. "They may be able to do it!"

Nancy contacted amateur headquarters. They were dubious until Dan verified the request. Then the word passed around the world.

"Can you imagine all the ham rigs in the world broadcasting on the same frequency at once? We'll fry the Little Dingbats right in their shells!"

"I wonder if you're right," said Dan fervently.

Around the Earth ham rigs were hastily and crudely modified, some at midnight and some at noonday. But within a few hours hundreds of thousands of sets began pouring out lethal radiation, forming pathogenic hosts for the parasites.

The results were almost instantaneous. News reports verified the success of the attack. And then the world began to wonder. Dan knew that explanations would have to be made carefully and quickly, but for the moment he rested. Power was coming back and the cities of the Earth were alive again.

"Some day I'm going to find out exactly what we're doing to the parasites," he said. "I can't believe this acts as poison as Nancy suggests."

"It looks like pretty high-power poison to me," said Bud.

"How can minute electrical circuits such as those in the parasites respond to seven megacycles?"

"They do it. That's enough."

"I'm going to find out before this is over. But right now I'm still worried. I wish we could get all the dead Little Dingbats and bury them a mile deep."

Nancy looked startled. "Why? What good would that do?"

Dan returned her gaze. "I know you hams," he said, "and the breed you come from. Some hams are going to get hold of dead parasites and won't let them alone without tinkering into the innards. And I'm just afraid that some ham will try to get one back in working order—with a shield against FM."

THE END.

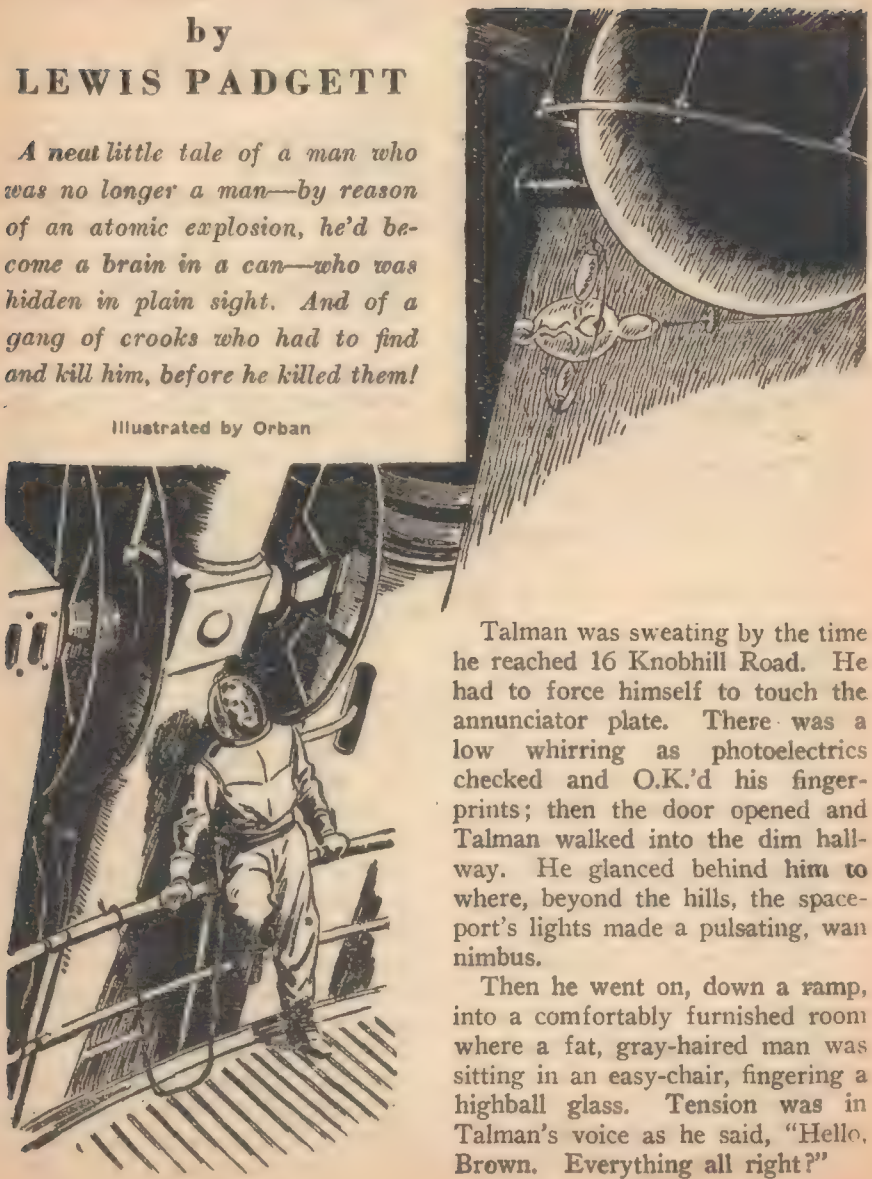
Camouflage

by

LEWIS PADGETT

A neat little tale of a man who was no longer a man—by reason of an atomic explosion, he'd become a brain in a can—who was hidden in plain sight. And of a gang of crooks who had to find and kill him, before he killed them!

Illustrated by Orban



Talman was sweating by the time he reached 16 Knobhill Road. He had to force himself to touch the annunciator plate. There was a low whirring as photoelectrics checked and O.K.'d his fingerprints; then the door opened and Talman walked into the dim hallway. He glanced behind him to where, beyond the hills, the spaceport's lights made a pulsating, wan nimbus.

Then he went on, down a ramp, into a comfortably furnished room where a fat, gray-haired man was sitting in an easy-chair, fingering a highball glass. Tension was in Talman's voice as he said, "Hello, Brown. Everything all right?"

A grin stretched Brown's sagging

cheeks. "Sure," he said. "Why not? The police weren't after you, were they?"

Talman sat down and began mixing himself a drink from the server near by. His thin, sensitive face was shadowed.

"You can't argue with your glands. Space does that to me anyway. All the way from Venus I kept expecting somebody to walk up to me and say, 'You're wanted for questioning.'"

"Nobody did."

"I didn't know what I'd find here."

"The police didn't expect us to head for Earth," Brown said, rumpling his gray hair with a shapeless paw. "And that was your idea."

"Yeah. Consulting psychologist to—"

"—to criminals. Want to step out?"

"No," Talman said frankly, "not with the profits we've got in sight already. This thing's big."

Brown grinned. "Sure it is. Nobody ever organized crime before, in just this way. There wasn't any crime worth a row of pins until we started."

"Where are we now, though? On the run."

"Fern's found a foolproof hideout."

"Where?"

"In the asteroid belt. We need one thing, though."

"What's that?"

"An atomic power plant."

Talman looked startled. But he saw that Brown wasn't kidding. After a moment, he put down his glass and scowled.

"I'd say it's impossible. A power plant's too big."

"Yeah," Brown said, "except that this one's going by space to Callisto."

"High-jacking? We haven't enough men—"

"The ship's under Transplant-control."

Talman cocked his head to one side. "Uh. That's out of my line—"

"There'll be a skeleton crew, of course. But we'll take care of them—and take their places. Then it'll simply be a matter of unhitching the Transplant and rigging up manuals. It isn't out of your line at all. Fern and Cunningham can do the technical stuff, but we've got to find out first just how dangerous a Transplant can be."

"I'm no engineer."

Brown went on, ignoring the comment. "The Transplant who's handling this Callisto shipment used to be Bart Quentin. You knew him, didn't you?"

Talman, startled, nodded. "Sure. Years ago. Before—"

"You're in the clear, as far as the police are concerned. Go to see Quentin. Pump him. Find out . . . Cunningham will tell you what to find out. After that, we can go ahead. I hope."

"I don't know. I'm not—"

Brown's brows came down. *"We've got to find a hideout!* That's absolutely vital right now. Otherwise, we might as well walk into the nearest police station and

hold out our hands for cuffs. We've been clever, but now—we've *got* to hide. Fast!"

"Well . . . I get that. But do you know what a Transplant really is?"

"A free brain. One that can use artificial gadgets."

"Technically, yeah. Ever seen a Transplant working a power-digger? Or a Venusian sea-dredge? Enormously complicated controls it'd normally take a dozen men to handle?"

"Implying a Transplant's a superman?"

"No," Talman said slowly, "I don't mean that. But I've got an idea it'd be safer to tangle with a dozen men than with one Transplant."

"Well," Brown said, "go up to Quebec and see Quentin. He's there now, I found out. Talk to Cunningham first. We'll work out the details. What we've got to know are Quentin's powers and his vulnerable points. And whether or not he's telepathic. You're an old friend of Quentin, and you're a psychologist, so you're the guy for the job."

"Yeah."

"We've got to get that power plant. *We've got to hide, now!*"

Talman thought that Brown had probably planned this from the beginning. The fat man was shrewd enough: he'd been sufficiently clever to realize that ordinary criminals would stand no chance in a highly technical, carefully specialized world. Police forces could call on the sciences to aid them. Communication was excellent and fast, even between the planets. There were gadgets— The only chance of bringing off a successful crime was to do it fast and then make an almost instantaneous getaway.

But the crime had to be planned. When competing against an organized social unit, as any crook does, it's wise to create a similar unit. A blackjack has no chance against a rifle. A strong-arm bandit was doomed to quick failure, for a similar reason. The traces he left would be analyzed; chemistry, psychology, and criminology would track him down; he'd be made to confess. Made to, without any third-degree methods. So—

So Cunningham was an electronics engineer. Fern was an astrophysicist. Talman himself was a psychologist. Big, blond Dalquist was a hunter, by choice and profession, beautifully integrated and tremendously fast with a gun. Cotton was a mathematician—and Brown himself was the co-ordinator. For three months the combination had worked successfully on Venus. Then, inevitably, the net closed, and the unit filtered back to Earth, ready to take the next step in the long-range plan. What it was Talman hadn't known till now. But he could readily see its logical necessity.

In the vast wilderness of the Asteroid Belt they could hide forever, if necessary, emerging to pull off a coup whenever opportunity offered. Safe, they could build up an underground criminal organiza-

tion, with a spy-system flung broadcast among the planets—yes, it was the inevitable way. Just the same, he felt hesitant about matching wits with Bart Quentin. The man wasn't—human—any more—

He was worried on the way to Quebec. Cosmopolitan though he was, he couldn't help anticipating tension, embarrassment, when he saw Quent. To pretend to ignore that—accident—would be too obvious. Still— He remembered that, seven years ago, Quentin had possessed a fine, muscular physique, and had been proud of his skill as a dancer. As for Linda, he wondered what had happened on that score. She couldn't still be Mrs. Bart Quentin, under the circumstances. Or could she?

He watched the St. Lawrence, a dull silver bar, below the plane as it slanted down. Robot pilots—a narrow beam. Only during violent storms did standard pilots take over. In space it was a different matter. And there were other jobs, enormously complicated, that only human brains could handle. A very special type of brain, at that.

A brain like Quentin's.

Talman rubbed his narrow jaw and smiled wanly, trying to locate the source of his worry. Then he had the answer. Did Quent, in this new incarnation, possess more than five senses? Could he detect reactions a normal man could not appreciate? If so, Van Talman was definitely sunk.

He glanced at his seat-mate, Dan Summers of Wyoming Engineers, through whom he had made the contact with Quentin. Summers, a blond young man with sun-wrinkles around his eyes, grinned casually.

"Nervous?"

"Could be that," Talman said. "I was wondering how much he'll have changed."

"Results are different in every case."

The plane, beam controlled, slid down the slopes of sunset air toward the port. Quebec's lighted towers made an irregular backdrop.

"They do change, then?"

"I suppose, psychically, they've got to. You're a psychologist, Mr. Talman. How'd you feel, if—"

"There might be compensations."

Summers laughed. "That's an understatement. Compensations . . . why, immortality's only one such . . . compensation!"

"You consider that a blessing?" Talman asked.

"Yes, I do. He'll remain at the peak of his powers for God knows how long. There'll be no deterioration. Fatigue poisons are automatically eliminated by irradiation. Brain cells can't replace themselves, of course, the way . . . say . . . muscular tissue can; but Quent's brain can't be injured, in its specially built case. Arteriosclerosis isn't any problem, with the plasmic solution we use—no calcium's deposited on the artery walls. The physical condition of his brain is automatically and perfectly controlled. The only ailments Quent can ever get are mental."

"Claustrophobia—No. You say

he's got eye-lenses. There'd be an automatic feeling of extension."

Summers said, "If you notice any change—outside of the perfectly normal one of mental growth in seven years—I'd be interested. With me—well, I grew up with the Transplants. I'm no more conscious of their mechanical, interchangeable bodies than a physician would think of a friend as a bundle of nerves and veins. It's the reasoning faculty that counts, and that hasn't altered."

Talman said thoughtfully, "You're a sort of physician, to the Transplants, anyway. A layman might get another sort of reaction. Especially if he were used to seeing . . a face."

"I'm never conscious of that lack."

"Is Quent?"

Summers hesitated. "No," he said finally, "I'm sure he isn't. He's beautifully adjusted. The reconditioning to Transplant life takes about a year. After that it's all velvet."

"I've seen Transplants working, on Venus, from a distance. But there aren't many spotted away from Earth."

"We haven't enough trained technicians. It takes literally half a lifetime to train a man to handle Transplantation. A man has to be a qualified electronic engineer before he even starts." Summers laughed. "The insurance companies cover a lot of the initial expense, though."

Talman was puzzled. "How's that?"

"They underwrite. Occupational risk, immortality. Working in atomic research is dangerous, my friend!"

They emerged from the plane into the cool night air. Talman said, as they walked toward a waiting car, "We grew up together, Quentin and I. But his accident happened two years after I left Earth, and I never saw him since."

"As a Transplant? Uh-huh. Well, it's an unfortunate name. Some jackass tagged the label on, whereas propaganda experts should have worked it out. Unfortunately it stuck. Eventually we hope to popularize the—Transplants. Not yet. We're only starting. We've only two hundred and thirty of them so far, the successful ones."

"Many failures?"

"Not now. In the early days—It's *complicated*. From the first trephining to the final energizing and reconditioning, it's the most nerve-racking, brain-straining, difficult technical task the human mind's ever worked out. Reconciling a colloid mechanism with an electronic hookup—but the result's worth it."

"Technologically. I wonder about the human values."

"Psychologically? We-all . . . Quentin will tell you about that angle. And technologically you don't know the half of it. No colloid machine, like the brain, has ever been developed—till now. And this isn't purely mechanical. It's merely a miracle, the synthesis of intelligent living tissue with delicate, responsive machinery."

"But handicapped by the limitation of the machine—and the brain."

"You'll see. Here we are. We're dining with Quent—"

Talman stared. *"Dining?"*

"Yeah." Summers' eyes showed quizzical amusement. "No, he doesn't eat steel shavings. In fact—"

The shock of meeting Linda again took Talman by surprise. He had not expected to see her. Not now, under these altered conditions. But she hadn't changed much; she was still the same warm, friendly woman he remembered, a little older now, yet very lovely and very gracious. She had always had charm. She was slim and tall, her head crowned by a bizarre coiffure of honey-amber coils, her brown eyes without the strain Talman might have expected.

He took her hands. "Don't say it," he said. "I know how long it's been."

"We won't count the years, Van." She laughed up at him. "We'll pick up right where we left off. With a drink, eh?"

"I could use one," Summers said, "but I've got to report back to headquarters. I'll just see Quent for a minute. Where is he?"

"In there." Linda nodded toward a door and turned back to Talman. "So you've been on Venus? You look bleached enough. Tell me how it's been."

"All right." He took the shaker from her hands and swirled the Martinis carefully. He felt embarrassment. Linda lifted an eyebrow.

"Yes, we're still married, Bart and I. You're surprised."

"A little."

"He's still Bart," she said quietly. "He may not look it, but he's the man I married, all right. So you can relax, Van."

He poured the Martinis. Without looking at her, he said, "As long as you're satisfied—"

"I know what you're thinking. That it'd be like having a machine for a husband. At first . . . well, I got over that feeling. We both did, after a while. There was constraint; I suppose you'll feel it when you see him. Only that isn't important, really. He's— Bart." She pushed a third glass toward Talman, and he looked at it in surprise.

"Not—"

She nodded.

The three of them dined together. Talman watched the two-foot-by-two cylinder resting on the table opposite him and tried to read personality and intelligence into the double lenses. He couldn't help imagining Linda as a priestess, serving some sort of alien god-image, and the concept was disturbing. Now Linda was forking chilled, sauce-daubed shrimps into the metallic compartment and spooning them out when the amplifier signaled.

Talman had expected a flat, toneless voice, but the sonovox gave depth and timbre whenever Quentin spoke.

"Those shrimps are perfectly usable, Van. It's only habit that

makes us throw chow out after I've had it in my foodbox. I taste the stuff, all right—but I haven't any salivary juices."

"You—taste 'em."

Quentin laughed a little. "Look, Van. Don't try to pretend this seems natural to you. You'll have to get used to it."

"It took me a long time," Linda said. "But after a while I found myself thinking it was just the sort of silly thing Bart always used to do. Remember the time you put on that suit of armor for the Chicago board meeting?"

"Well, I made my point," Quentin said. "I forget what it was now, but—we were talking about taste. I can taste these shrimps, Van. Certain nuances are lacking, yeah. Very delicate sensations are lost on me. But there's more to it than sweet and sour, salt and bitter. Machines could taste years ago."

"There's no digestion—"

"And there no pylorospasm. What I lose in refinements of taste I make up for in freedom from gastrointestinal disorders."

"You don't burp any more, either," Linda said. "Thank God."

"I can talk with my mouth full, too," Quentin said. "But I'm not the super-machine-bodied-brain you're subconsciously thinking I am, chum. I don't spit death rays."

Talman grinned uneasily. "Was I thinking that?"

"I'll bet you were. But—" The timbre of the voice changed. "I'm not super. I'm plenty human, inside, and don't think I don't miss the old days sometimes. Lying on the beach and feeling the sun on my skin, little things like that. Dancing in rhythm to music, and—"

"Darling," Linda said.

The voice changed again. "Yeah. It's the small, trivial factors that make up a complete life. But I've got substitutes now—parallel factors. Reactions quite impossible to describe, because they're . . . let's say . . . electronic vibrations instead of the familiar neural ones. I *do* have senses, but through mechanical organs. When impulses reach my brain, they're automatically translated into familiar symbols. Or—" He hesitated. "Not so much now, though."

Linda laid a bit of planked fish in the food-compartment. "Delusions of grandeur, eh?"

"Delusions of alteration—but no delusion, my love. You see, Van, when I first turned into a Transplant, I had no standard of comparison except the arbitrary one I already knew. That was suited to a human body—only. When, later, I felt an impulse from a digger-gadget, I'd automatically feel as if I had my foot on a car-accelerator. Now those old symbols are fading. I . . . feel . . . more directly now, without translating the impulses into the old-time images."

"That would be faster," Talman said.

"It is. I don't have to think of the value of pi when I get a pi signal. I don't have to break down the equation. I'm beginning to sense what the equation means."

"Synthesis with a machine?"

"Yet I'm no robot. It doesn't affect the identity, the personal essence of Bart Quentin." There was a brief silence, and Talman saw Linda look sharply toward the cylinder. Then Quentin continued in the same tone. "I get a tremendous bang out of solving problems. I always did. And now it's not just on paper. I carry out the whole task myself, from conception to finish. I dope out the application, and . . . Van, I *am* the machine!"

"Machine?" Talman said.

"Ever noticed, when you're driving or piloting, how you identify yourself with the machine? It's an extension of you. I go one step farther. And it's satisfying. Suppose you could carry empathy to the limit and *be* one of your patients while you were solving his problem? It's an—ecstasy."

Talman watched Linda pour sauterne into a separate chamber. "Do you ever get drunk any more?" he asked.

Linda gurgled. "Not on liquor—but Bart gets high, all right!"

"How?"

"Figure it out," Quentin said, a little smugly.

"Alcohol's absorbed into the blood-stream, thence reaching the brain—the equivalent of intravenous shots, maybe?"

"I'd rather put cobra venom in my circulatory system," the Transplant said. "My metabolic balance is too delicate, too perfectly organized, too upset by introducing foreign substances. No, I use electrical stimulus—an induced high-frequency current that gets me high as a kite."

Talman stared. "And that's a substitute?"

"It is. Smoking and drinking are irritants, Van. So's thinking, for that matter! When I feel the psychic need for a binge, I've a gadget that provides stimulating irritation—and I'll bet you'd get more of a bang out of it than you would out of a quart of mescal."

"He quotes Housman," Linda said. "And does animal imitations. With his tonal control, Bart's a wonder." She stood up. "If you'll excuse me for a bit, I've got some K. P. Automatic as the kitchen is, there are still buttons to push."

"Can I help?" Talman offered.

"Thanks, no. Stay here with Bart. Want me to hitch up your arms, darling?"

"Nope," Quentin said. "Van can take care of my liquid diet. Step it up, Linda—Summers said I've got to get back on the job soon."

"The ship's ready?"

"Almost."

Linda paused in the doorway, biting her lips. "I'll never get used to your handling a spaceship all by yourself. Especially that thing."

"It may be jury-rigged, but it'll get to Callisto."

"Well . . . there's a skeleton crew, isn't there?"

"There is," Quentin said, "but it isn't needed. The insurance companies demand an emergency crew. Summers did a good job, rigging the ship in six weeks."

"With chewing gun and paper

clips," Linda remarked. "I only hope it holds." She went out as Quentin laughed softly. There was a silence. Then, as never before, Talman felt that his companion was . . . was . . . had changed. For he felt Quentin gazing at him, and—Quentin wasn't there.

"Brandy, Van," the voice said. "Pour a little in my box."

Talman started to obey, but Quentin checked him. "Not out of the bottle. It's been a long time since I mixed rum and coke in my mouth. Use the inhaler. That's it. Now. Have a drink yourself and tell me how you feel."

"About—?"

"Don't you know?"

Talman went to the window and stood looking down at the reflected fluorescent shining in the St. Lawrence. "Seven years, Quent. It's hard to get used to you in this—form."

"I haven't lost anything."

"Not even Linda," Talman said. "You're lucky."

Quentin said steadily, "She stuck with me. The accident, five years ago, wrecked me. I was fooling around with atomic research, and there were chances that had to be taken. I was mangled. Butchered, in the explosion. Don't think Linda and I hadn't planned in advance. We knew the occupational risk."

"And yet you—"

"We figured the marriage could last, even if—But afterward I almost insisted on a divorce. She convinced me we could still make a go of it. And we have."

Talman nodded. "I'd say so."

"That . . . kept . . . me going, for quite a while," Quentin said softly. "You know how I felt about Linda. It's always been just about a perfect equation. Even though the factors have changed, we've adjusted." Suddenly Quentin's laugh made the psychologist swing around. "I'm no monster, Van. Try and get over that idea!"

"I never thought that," Talman protested. "You're—"

"What?"

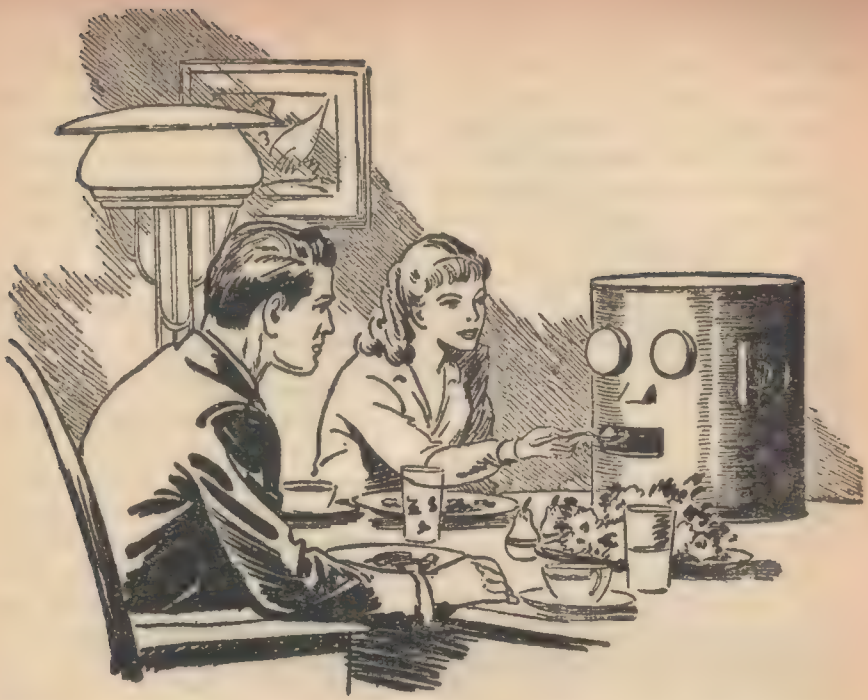
Silence again. Quentin grunted. "In five years I've learned to notice how people react to me. Give me some more brandy. I still imagine I taste it with my palate. Odd how associations hang on."

Talman poured liquor from the inhaler. "So you figure you haven't changed, except physically."

"And you figure me as a raw brain in a metal cylinder. Not as the guy you used to get drunk with on Third Avenue. Oh, I've changed—sure. But it's a normal change. There's nothing innately alien about limbs that are metal extensions. It's one step beyond driving a car. If I were the sort of super-gadget you subconsciously think I am, I'd be an utter introvert and spend my time working out cosmic equations." Quentin used a vulgar expletive. "And if I did that, I'd go nuts. Because I'm no superman. I'm an ordinary guy, a good physicist, and I've had to adjust to a new body. Which, of course, has its handicaps."

"What, for example?"

"The senses. Or the lack of



them. I helped develop a lot of compensatory apparatus. I read escapist fiction, I get drunk by electrical irritation, I taste even if I can't eat. I watch teleshows. I try to get the equivalent of all the purely human sensory pleasures I can. It makes a balance that's very necessary."

"It would be. Does it work, though?"

"Look. I've got eyes that are delicately sensitive to shades and gradations of color. I've got arm-attachments that can be refined down until they can handle microscopic apparatus. I can draw pictures—and, under a pseudonym, I'm a pretty popular cartoonist. I do that as a sideline. My real job is still physics. And it's still a good job. You know the feeling of pure pleasure you get when you've worked out a problem, in geometry or electronics or psychology—or anything? Now I work out questions infinitely more complicated, requiring split-second reaction as well as calculation. Like handling a spaceship. More brandy. It's volatile stuff in a hot room."

"You're still Bart Quentin," Talman said, "but I feel surer of that when I keep my eyes shut. Handling a spaceship—"

"I've lost nothing human," Quentin insisted. "The emotional basics haven't changed. It . . . isn't really pleasant to have you come in and look at me with plain horror, but I

can understand the reason. We've been friends for a long time, Van. You may forget that before I do."

Sweat was suddenly cold on Talman's stomach. But despite Quentin's words, he felt certain by now that he had part of the answer for which he had come to Quebec. The Transplant had no abnormal powers—there were no telepathic functions.

There were more questions to be asked, of course.

He poured more brandy and smiled at the dully-shining cylinder across the table. He could hear Linda singing softly from the kitchen.

The spaceship had no name, for two reasons. One was that she would make only a single trip, to Callisto; the other was odder. She was not, essentially, a ship with a cargo. She was a cargo with a ship.

Atomic power plants are not ordinary dynamos that can be dismantled and crated on a freight car. They are tremendously big, powerful, bulky, and behemothic. It takes two years to complete an atomic set-up, and even after that, the initial energizing must take place on Earth, at the enormous standards control plant that covers seven counties of Pennsylvania. The Department of Weights, Measures, and Power has a chunk of metal in a thermostatically-controlled glass case in Washington; it's the standard meter. Similarly, in Pennsylvania, there is, under fantastic precautionary conditions, the one key atomic-disruptor in the Solar System.

There was only one requirement for fuel; it was best to filter it through a wire screen with, approximately, a one-inch gauge. And that was an arbitrary matter, for convenience in setting up a standard of fuels. For the rest, atomic power ate anything.

Few people played with atomic power; the stuff's violent. The research engineers worked on a stagger system. Even so, only the immortality insurance—the Transplantidea—kept neuroses from developing into psychoses.

The Callisto-bound power plant was too big to be loaded on the largest ship of any commercial line, but it had to get to Callisto. So the technicians built a ship around the power plant. It was not exactly jury-rigged, but it was definitely unstandardized. It occasionally, in matters of design, departed wildly from the norm. The special requirements were met deftly, often unorthodoxly, as they came up. Since the complete control would be in the hands of the Transplant Quentin, only casual accommodations were provided for the comfort of the small emergency crew. They weren't intended to wander through the entire ship unless a breakdown made it necessary, and a breakdown was nearly impossible. In fact, the vessel was practically a living entity. But not quite.

The Transplant had extensions—tools—throughout various sections of the great craft. Yet they were specialized to deal with the job in

hand. There were no sensual attachments, except auditory and ocular. Quentin was, for the nonce, simply a super spaceship drive control. The brain cylinder was carried into the craft by Summers, who inserted it—somewhere!—plugged it in, and that finished the construction job.

At 2400 the mobile power plant took off for Callisto.

A third of the way to the Martian orbit, six spacesuited men came into an enormous chamber that was a technician's nightmare.

From a wall amplifier, Quentin's voice said, "What are you doing here, Van?"

"O.K.," Brown said. "This is it. We'll work fast now. Cunningham, locate the connection. Dalquist, keep your gun ready."

"What'll I look for?" the big, blond man asked.

Brown glanced at Talman. "You're certain there's no mobility?"

"I'm certain," Talman said, his eyes moving. He felt naked exposed to Quentin's gaze, and not liking it.

Cunningham, gaunt, wrinkled and scowling, said, "The only mobility's in the drive itself. I was sure of that before Talman double-checked. When a Transplant's plugged in for one job, it's limited to the tools it needs for that job."

"Well, don't waste time talking. Break the circuit."

Cunningham stared through his vision plate. "Wait a minute. This isn't standardized equipment. It's experimental . . . casual. I've got to trace a few . . . um."

Talman was surreptitiously trying to spot the Transplant's eye lenses, and failing. From somewhere in that maze of tubes, coils, wires, grids and engineering hash, he knew, Quentin was looking at him. From several places, undoubtedly—there'd be over-all vision, with eyes spotted stragetically around the room.

And it was a big room, this central control chamber. The light was misty yellow. It was like some strange, unearthly cathedral in its empty, towering height, a hugeness that dwarfed the six men. Bare grids, abnormally large, hummed and sparked; great vacuum tubes flamed eerily. Around the walls above their heads ran a metal platform, twenty feet up, a metal guard rail casually precautionary. It was reached by two ladders, on opposite walls of the room. Overhead hung a celestial globe, and the dim throbbing of tremendous power murmured in the chlorinated atmosphere.

The amplifier said, "What is this, piracy?"

Brown said casually, "Call it that. And relax. You won't be harmed. We may even send you back to Earth, when we can figure out a safe way to do it."

Cunnignham was investigating lucite mesh, taking care to touch nothing. Quentin said, "This cargo isn't worth highjacking. It isn't radium I'm carrying, you know."

"I need a power plant," Brown remarked curtly.

"How did you get aboard?"

Brown lifted a hand to mop sweat from his face, and then, grimacing, refrained. "Find anything yet, Cunningham?"

"Give me time. I'm only an electronics man. This setup's screwy. Fern, give me a hand here."

Talman's discomfort was growing. He realized that Quentin, after the first surprised comment, had ignored him. Some indefinable compulsion made him tilt back his head and say Quentin's name.

"Yeah," Quentin said. "Well? So you're in with this gang?"

"Yes."

"And you were pumping me, up in Quebec. To make sure I was harmless."

Talman made his voice expressionless. "We had to be certain."

"I see. How'd you get aboard? The radar automatically dodges approaching masses. You couldn't have brought your own ship alongside in space."

"We didn't. We got rid of the emergency crew and took their suits."

"Got rid of them?"

Talman moved his eyes toward Brown. "What else could we do? We can't afford half-measures in a gamble as big as this. Later on, they'd have been a danger to us, after our plans started moving. Nobody's going to know anything about it, except us. And you." Again Talman looked at Brown. "I think, Quent, you'd better throw in with us."

The amplifier ignored whatever implied threat lay in the suggestion.

"What do you want the power plant for?"

"We've got an asteroid picked out," Talman said, tilting his head back to search the great crowded hollow of the ship, swimming a little in the haze of its poisonous atmosphere. He half expected Brown to cut him short, but the fat man didn't speak. It was, he thought, curiously difficult to talk persuasively to someone whose location you didn't know. "The only trouble is, it's airless. With the plant, we can manufacture our own air. It'd be a miracle if anybody ever found us in the asteroid belt."

"And then what? Piracy?"

Talman did not answer. The voice-box said thoughtfully, "It might make a good racket, at that. For awhile, anyhow. Long enough to clean up quite a lot. Nobody will expect anything like it. Yeah, you might get away with the idea."

"Well," Talman said, "if you think that, what's the next logical step?"

"Not what you think. I wouldn't play along with you. Not for moral reasons, especially, but for motives of self-preservation. I'd be useless to you. Only in a highly intricate, widespread civilization is there any need for Transplants. I'd be excess baggage."

"If I gave you my word—"

"You're not the big shot," Quentin told him. Talman instinctively sent another questioning look at Brown. And from the voice-box

on the wall came a curious sound like a smothered laugh.

"All right," Talman said, shrugging. "Naturally you won't decide in our favor right away. Think it over. Remember you're not Bart Quentin any more—you've got certain mechanical handicaps. While we haven't got too much time, we can spare a little—say ten minutes—while Cuningham looks things over. Then . . . well, we aren't playing for marbles, Quent." His lips thinned. "If you'll throw in with us and guide the ship under our orders, we can afford to let you live. But you've got to make up your mind fast. Cunningham is going to trace you down and take over the controls. After that—"

"What makes you so sure I can be traced down?" Quentin asked calmly. "I know just how much my life would be worth once I'd landed you where you want to go. You don't need me. You couldn't give me the right maintenance even if you wanted to. No, I'd simply join the crewmen you've already disposed of. I'll give you an ultimatum of my own."

"You'll—what?"

"Keep quiet and don't monkey with anything, and I'll land in an isolated part of Callisto and let you all escape," Quentin said. "If you don't, God help you."

For the first time Brown showed he had been conscious of that distant voice. He turned to Talman.

"Bluff?"

Talman nodded slowly. "Must be. He's harmless."

"Bluff," Cunningham said, without looking up from his task.

"No," the amplifier told him quietly, "I'm not bluffing. And be careful with that board. It's part of the atomic hookup. If you fool with the wrong connections, you're apt to blast us all out of space."

Cunningham jerked back from the maze of wires snaking out of the bakelite before him. Fern, some distance away, turned a swarthy face to watch. "Easy," he said. "We've got to be sure what we're doing."

"Shut up," Cunningham grunted. "I *do* know. Maybe that's what the Transplant's afraid of. I'll be plenty careful to stay clear of atomic connections, but—" He paused to study the tangled wires. "No. This isn't atomic—I think. Not the control leads, anyway. Suppose I break this connection—" His gloved hand came up with a rubber-sheathed cutter.

The voice-box said, "Cunningham—don't." Cunningham poised the cutter. The amplifier sighed.

"You first, then. Here it is!"

Talman felt the transparent face plate slap painfully against his nose. The immense room bucked dizzly as he went reeling forward, unable to check himself. All around him he saw grotesque spacesuited figures reeling and stumbling. Brown lost his balance and fell heavily.

Cunningham had been slammed forward into the wires as the ship abruptly decelerated. Now he hung like a trapped fly in the tangle, his limbs, his head, his whole body jerking and twitching with spas-

modic violence. The devil's dance increased in fury.

"Get him out of there!" Lindquist yelled.

"Hold it!" Fern shouted. "I'll cut the power—" But he didn't know how. Talman, dry-throated, watched Cunningham's body sprawling, arching, shaking in spastic agony. Bones cracked suddenly.

Cunningham jerked more limply now, his head flopping grotesquely.

"Get him down," Brown snapped, but Fern shook his head.

"Cunningham's dead. And that hookup's dangerous."

"How? Dead?"

Under his thin mustache Fern's lips parted in a humorless smile. "A guy in an epileptic fit can break his own neck."

"Yeah," Dalquist said, obviously shaken. "His neck's broken, all right. Look at the way his head goes."

"Put a twenty-cycle alternating current through yourself and you'd go into convulsions too," Fern advised.

"We can't just leave him there!"

"We can," Brown said, scowling. "Stay away from the walls, all of you." He glared at Talman. "Why didn't you—"

"Sure, I know. But Cunningham should have had sense enough to stay away from bare wires."

"Few wires are insulated around here," the fat man growled. "You said the Transplant was harmless."

"I said he had no mobility. And that he wasn't a telepath." Talman realized that his voice sounded defensive.

Fern said, "A signal's supposed to sound whenever the ship accelerates or decelerates. It didn't go off that time. The Transplant must have cut it out himself, so we wouldn't be warned."

They looked up into that humming, vast, yellow emptiness. Claustrophobia gripped Talman. The walls looked ready to topple in —to fold down, as though he stood in the cupped hand of a titan.

"We can smash his eye cells," Brown suggested.

"Find 'em." Fern indicated the maze of equipment.

"All we have to do is unhitch the Transplant. Break his connection. Then he goes dead."

"Unfortunately," Fern said, "Cunningham was the only electronic engineer among us. I'm only an astrophysicist!"

"Never mind. We pull one plug and the Transplant blacks out. You can do that much!"

Anger flared. But Cotton, a little man with blinking blue eyes, broke the tension.

"Mathematics — geometry — ought to help us. We want to locate the Transplant, and—" He glanced up and was frozen. "We're off our course!" he said finally, licking dry lips. "See that telltale?"

Far above, Talman could see the enormous celestial globe. On its dark surface a point of red light was clearly marked.

Fern's swarthy face showed a sneer. "Sure. The Transplant's running to cover. Earth's the nearest place where he can get help.

But we've plenty of time left. I'm not the technician Cunningham was, but I'm not a complete dope." He didn't look at the rhythmically-moving body on the wires. "We don't have to test every connection in the ship."

"O.K., take it, then," Brown grunted.

Awkward in his suit, Fern walked to a square opening in the floor and peered down at a mesh-metal grating eighty feet below. "Right. Here's the fuel-feed. We don't need to trace connections through the whole ship. The fuel's dumped out of that leader tube overhead there. Now look. Everything connected with the atomic power is apparently marked with red wax-crayon. See?"

They saw. Here and there, on bare plates and boards, were cryptic red markings. Other symbols were in blue, green, black and white.

"Go on that assumption," Fern said. "Temporarily, anyhow. Red's atomic power. Blue . . . green . . . um."

Talman said suddenly, "I don't see anything here that looks like Quentin's brain-case."

"Did you expect to?" the astrophysicist asked sardonically. "It's slid into a padded socket somewhere. The brain can stand more gravs than the body, but seven's about tops in any case. Which, incidentally, is fine for us. There'd be no use putting high-speed potential in this ship. The Transplant couldn't stand it, any more than we could."

"Seven G's," Brown said thoughtfully.

"Which would black out the Transplant too. He'll have to remain conscious to pilot the ship through Earth atmosphere. We've got plenty of time."

"We're going pretty slow now," Dalquist put in.

Fern gave the celestial globe a sharp glance. "Looks like it. Let me work on this." He paid out a coil from his belt and hitched himself to one of the central pillars. "That'll guard against any more accidents."

"Tracing a circuit shouldn't be so hard," Brown said.

"Ordinarily it isn't. But you've got everything in this chamber—atomic control, radar, the kitchen sink. And these labels are only for construction convenience. There wasn't any blueprint to this ship. It's a single-shot model. I can find the Transplant, but it'll take time. So shut up and let me work."

Brown scowled but didn't say anything. Cotton's bald head was sweating. Dalquist wrapped his arm about a metal pillar and waited. Talman looked up again at the balcony that hung from the walls. The celestial globe showed a crawling disk of red light.

"Quent," he said.

"Yes, Van." Quentin's voice was quietly distant. Brown put one hand casually to the blaster at his belt.

"Why don't you give up?"

"Why don't you?"

"You can't fight us. Your getting Cunningahm was a fluke. We're

on guard now—you can't hurt us. It's only a matter of time until we trace you down. Don't look for mercy then, Quent. You can save us trouble by telling us where you are. We're willing to pay for that. After we find you—on our own initiative—you can't bargain. How about it?"

Quentin said simply, "No."

There was silence for a few minutes. Talman was watching Fern, who, very cautiously paying out his coil, was investigating the tangle where Cunningham's body still hung.

Quentin said, "He won't find the answer there. I'm pretty well camouflaged."

"But helpless," Talman said quickly.

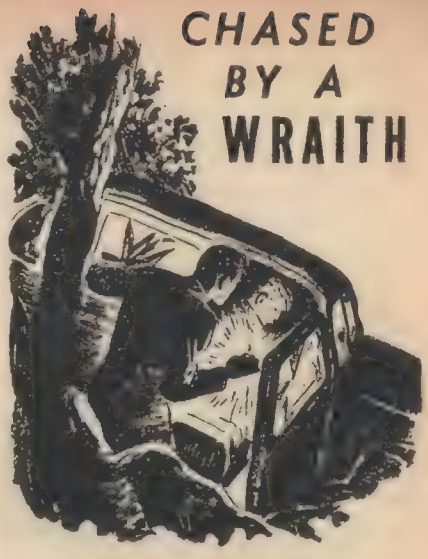
"So are you. Ask Fern. If he monkeys with the wrong connections, he's apt to destroy the ship. Look at your own problem. We're heading back toward Earth. I'm swinging into a new course that'll end at the home berth. If you give up now—"

Brown said, "The old statutes never were altered. The punishment for piracy is death."

"There's been no piracy for a hundred years. If an actual case came to trial, it might be a different matter."

"Imprisonment? Reconditioning?" Talman asked. "I'd a lot rather be dead."

"We're decelerating," Dalquist called, getting a firmer grip on his pillar.



It was frightening, horrifying, relentless in its pursuit—an intangible wraith-like *thing* that drove aviators mad.

The small man had something to do with it—and something to do with the strange, terrifying death of Lew Page, A.T.C. pilot.

Doc Savage had to find out the weird circumstances behind THE THING THAT PURSUED. Read this exciting story in the October issue of

DOC SAVAGE

AT ALL NEWSSTANDS

Looking at Brown, Talman thought the fat man knew what he had in mind. If technical knowledge failed, psychology might not. And Quentin, after all, was a human brain.

First get the subject off guard.

"Quent."

But Quentin didn't answer. Brown grimaced and turned to watch Fern. Sweat was pouring down the physicist's swarthy face as he concentrated on the hookups, drawing diagrams on the stylopad he wore attached to his forearm.

After a while Talman began to feel dizzy. He shook his head, realizing that the ship had decelerated almost to zero, and got a firmer grip on the nearest pillar. Fern cursed. He was having a difficult time keeping his footing.

Presently he lost it altogether as the ship went free. Five space-suited figures clung to convenient handgrips. Fern snarled, "This may be deadlock, but it doesn't help the Transplant. I can't work without gravity—he can't get to Earth without acceleration."

The voice-box said, "I've sent out an S O S."

Fern laughed. "I worked that out with Cunningham—and you talked too much to Talman, too. With a radar meteor-avoider, you don't need signaling apparatus, and you haven't got it." He eyed the apparatus he had just left. "Maybe I was getting too close to the right answer, though, eh? Is that why—"

"You weren't even near it," Quentin said.

"Just the same—" Fern kicked himself away from the pillar, paying out the line behind him. He made a loop about his left wrist, and, hanging in midair, fell to studying the hookup.

Brown lost his grip on the slippery column and floated free like some over-inflated balloon. Talman kicked himself across to the railed balcony. He caught the metal bar in gloved hands, swung himself in like an acrobat, and looked down—though it wasn't really *down*—at the control chamber.

"I think you'd better give up." Quentin said.

Brown was floating across to join Fern. "Never," he said, and simultaneously four G's hit the ship with the impact of a pile driver. It wasn't forward acceleration. It was in another, foreplanned direction. Fern saved himself at the cost of an almost dislocated wrist—but the looped line rescued him from a fatal dive into uninsulated wiring.

Talman was slammed down on the balcony. He could see the others plummet to hard impacts on unyielding surfaces. Brown wasn't stopped by the floor plate, though.

He had been hovering over the fuel-feed hole when the acceleration was slammed on.

Talman saw the bulky body pop out of sight down the opening. There was an indescribable sound.

Dalquist, Fern, and Cotton struggled to their feet. They cautiously went toward the hole and peered down.

Talman called, "Is he—"

Cotton had turned away. Dalquist remained where he was, apparently fascinated, Talman thought, until he saw the man's shoulders heaving. Fern looked up toward the balcony.

"He went through the filter screen," he said. "It's a one-inch gauge metal mesh."

"Broke through?"

"No," Fern said deliberately. "He didn't break through. He *went* through."

Four gravities and a fall of eighty feet add up to something slightly terrific. Talman shut his eyes and said, "Quent!"

"Do you give up?"

Fern snarled, "Not on your life! Our unit's not that interdependent. We can do without Brown."

Talman sat on the balcony, held on to the rail, and let his feet hang down into emptiness. He stared across to the celestial globe, forty feet to his left. The red spot that marked the ship stood motionless.

"I don't think you're human any more, Quent," he said.

"Because I don't use a blaster? I've different weapons to fight with now. I'm not kidding myself, Van. I'm fighting for my life."

"We could still bargain."

Quentin said, "I told you you'd forget our friendship before I did. You must have known this highjacking could only end in my death. But apparently you didn't care about that."

"I didn't expect you to—"

"Yeah," the voice-box said. "I wonder if you'd have been as ready to go through with the plan if I'd still had human form? As for friendship—use your own tricks of psychology, Van. You look on my mechanical body as an enemy, a barrier between you and the real Bart Quentin. Subconsciously, maybe, you hate it, and you're therefore willing to destroy it. Even though you'll be destroying me with it. I don't know—perhaps you rationalize that you'd thus be rescuing me from the thing that's erected the barrier. And you forget that I haven't changed, basically."

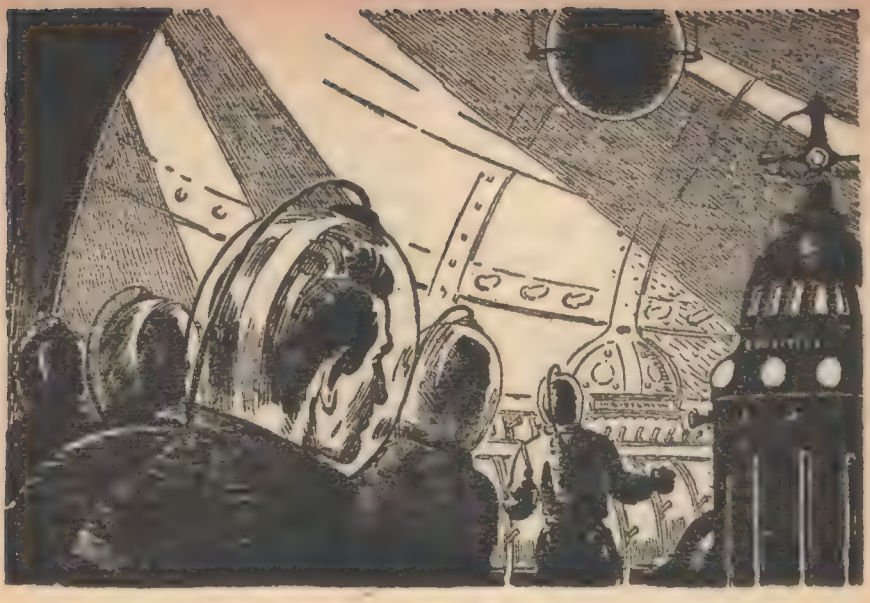
"We used to play chess together," Talman said, "but we didn't smash the pawns."

"I'm in check," Quentin countered. "All I've got to fight with are knights. You've still got castles and bishops. You can move straight for your goal. Do you give up?"

"No!" Talman snapped. His eyes were on the red light. He saw a tremor move it, and gripped the metal rail with a frantic clutch. His body swung out as the ship jumped. One gloved hand was torn from its grip. But the other held. The celestial globe was swinging violently. Talman threw a leg over the rail, clambered back to his precarious perch, and looked down.

Fern was still braced by his emergency line. Dalquist and little Cotton were sliding across the floor, to bring up with a crash against a pillar. Someone screamed.

Sweating, Talman warily descended. But by the time he had reached Cotton the man was dead.



Radiating cracks in his face-plate and contorted, discolored features gave the answer.

"He slammed right into me," Dalquist gulped. "His plate cracked into the back of my helmet—"

The chlorinated atmosphere within the sealed ship had ended Cotton's life, not easily, but rapidly. Dalquist, Fern and Talman matched glances.

The blond giant said, "Three of us left. I don't like this. I don't like it at all."

Fern showed his teeth. "So we're still underestimating that thing. From now on, hitch yourselves to pillars. Don't move without sound anchorage. Stay clear of everything that might cause trouble."

"We're still heading back toward Earth," Talman said.

"Yeah." Fern nodded. "We could open a port and walk out into free space. But then what? We figured we'd be using this ship. Now we've *got* to."

Dalquist said, "If we gave up—"

"Execution," Fern said flatly. "We've still got time. I've traced some of the connections. I've eliminated a lot of hookups."

"Still think you can do it?"

"I think so. But don't let go of your handgrips for a second. I'll find the answer before we hit atmosphere."

Talman had a suggestion. "Brains send out recognizable vibration patterns. A directional finder, maybe?"

"If we were in the middle of the Mojave, that would work. Not here. This ship's lousy with currents and radiations. How could

we unscramble them without apparatus?"

"We brought some apparatus with us. And there's plenty all around the walls."

"Hooked up. I'm going to be plenty careful about upsetting the *status quo.* I wish Cunningham hadn't gone down the drain."

"Quentin's no fool," Talman said. "He got the electronic engineer first and Brown second. He was trying for you then, too. Bishop and queen."

"Which makes me what?"

"Castle. He'll get you if he can." Talman frowned, trying to remember something. Then he had it. He bent over the stylopad on Fern's arm, shielding the writing with his own body from any photoelectrics that might be spotted around the walls or ceiling. He wrote: "He gets drunk on high frequency. Can do?"

Fern crumpled the tissue slip and tore it awkwardly into fragments with his gloved fingers. He winked at Talman and nodded briefly.

"Well, I'll keep trying," he said, and paid out his line to the kit of apparatus he and Cunningham had brought aboard.

Left alone, Dalquist and Talman hitched themselves to pillars and waited. There was nothing else they could do. Talman had already mentioned this high-frequency irritation angle to Fern and Cunningham; they had seen no value to the knowledge then. Now it might be the answer, with applied practical psychology to supplement technology.

Meanwhile, Talman longed for a cigarette. All he could do, sweating in the uncomfortable suit, was to manipulate a built-in gadget so that he managed to swallow a salt tablet and a few gulps of tepid water. His heart was pounding, and there was a dull ache in his temples. The spacesuit was uncomfortable; he wasn't used to such personal confinement.

Through the built-in receiving gadget he could hear the humming silence, broken by the padding rustle of sheathed boots as Fern moved about. Talman blinked at the chaos of equipment and closed his eyes; the relentless yellow light, not intended for human vision, made little pulses beat nervously somewhere in his eye sockets. Somewhere in this ship, he thought, probably in this very chamber, was Quentin. But camouflaged. How?"

Purloined letter stuff? Scarcely. Quentin would have had no reason to expect highjackers. It was pure accident that had intervened to protect the Transplant with such an excellent hiding place. That, and the slapdash methods of technicians constructing a one-job piece of equipment with the casual convenience of a slipstick.

But, Talman thought, if Quentin could be made to reveal his location—

How? Via induced cerebral irritation—intoxication?

Appeal to basics? But a brain couldn't propagate the species. Self-preservation remained the only

constant. Talman wished he'd brought Linda along. He'd have had a lever then.

If only Quentin had had a human body, the answer would not be so difficult to find. And not necessary by torture. Automatic muscular reactions, the old standby of professional magicians, could have led Talman to his goal. Unfortunately, Quentin himself was the goal—a bodiless brain in a padded, insulated metal cylinder. And his spinal cord was a wire.

If Fern could rig up a high-frequency device, the radiations would weaken Quentin's defenses—in one way, if not another. At present the Transplant was a very, very dangerous opponent. And he was perfectly camouflaged.

Well, not perfectly. Definitely no. Because, Talman realized with a sudden glow of excitement, Quentin wasn't simply sitting back, ignoring the pirates, and taking the quickest route back to Earth. The very fact that he was retracing his course instead of going on to Callisto indicated that Quentin wanted to get help. And, meanwhile, via murder, he was doing his utmost to distract his unwelcome guests.

Because, obviously, Quentin *could* be found.

Given time.

Cunningham could have done it. And even Fern was a menace to the Transplant. That meant that Quentin—was afraid.

Talman sucked in his breath. "Quent," he said, "I've a proposition. You listening?"

"Yes," the distant, terribly familiar voice said.

"I've an answer for all of us. You want to stay alive. We want this ship. Right?"

"Correct."

"Suppose we drop you by parachute when we hit Earth atmosphere. Then we can take over the controls and head out again. That way—"

"And Caesar is an honorable man," Quentin remarked. "But of course he wasn't. I can't trust you any more, Van. Psychiatrists and psychologists are too amoral. They're ruthless, because they feel the end justifies the means, and they rationalize away emotion and sentiment. You're an expert psychologist, Van, and that's exactly why I'd never take your word for anything."

"You're taking a long chance. If we do find the right hookup in time, there'll be no bargaining, you know."

"If."

"It's a long way back to Earth. We're taking precautions now. You can't kill any more of us. We'll simply keep working steadily till we find you. Now—what about it?"

After a pause Quentin said, "I'd rather take my chances. I know technological values better than I do human ones. As long as I depend on my own field of knowledge, I'm safer than if I tried to deal in psychology. I know coefficients and cosines, but I don't know much about the colloid machine in your skull."

Talman lowered his head; sweat

dripped from his nose to the interior of the face plate. He felt a sudden claustrophobia; fear of the cramped quarters of the suit, and fear of the larger dungeon that was the room and the ship itself.

"You're restricted, Quent," he said, too loudly. "You're limited in your weapons. You can't adjust atmospheric pressure in here, or you'd have compressed already and crushed us."

"Crushing vital equipment at the same time. Besides, those suits can take a lot of pressure."

"Your king's still in check."

"So is yours," Quentin said calmly.

Fern gave Talman a slow look that held approval and faint triumph. Under the clumsy gloves, manipulating delicate instruments, the hookup was beginning to take shape. Luckily, it was a job of conversion rather than construction, or time would have been too short.

"Enjoy yourself," Quentin said. "I'm slamming on all the G's we can take."

"I don't feel it," Talman said.

"All we can take, not all I could give out. Go ahead and amuse yourselves. You can't win."

"No?"

"Well—figure it out. As long as you stay hitched in one place, you're reasonably safe. But if you start moving around, I can destroy you."

"Which means we'll have to move—somewhere—in order to reach you, eh?"

Quentin laughed. "I didn't say

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so. I'm well camouflaged. *Turn that thing off!"*

The shout echoed and re-echoed against the vaulted roof, shaking the amber air. Talman jerked nervously. He met Fern's eye and saw the astrophysicist grin.

"It's hitting him," Fern said. Then there was silence, for many minutes.

The ship abruptly jumped. But the frequency inductor was securely moored, and the men, too, were anchored by their lines.

"Turn it off," Quentin said again. His voice wasn't quite under control.

"Where are you?" Talman asked.

No answer.

"We can wait, Quent."

"Keep waiting, then! I'm . . . I'm not distracted by personal fear. That's one advantage of being a Transplant."

"High irritant value," Fern murmured. "It works fast."

"Come on, Quent," Talman said persuasively. "You've still got the instinct of self-preservation. This can't be pleasant for you?"

"It's . . . too pleasant," Quentin said unevenly. "But it won't work. I could always stand my liquor."

"This isn't liquor," Fern countered. He touched a dial.

The Transplant laughed; Talman noted with satisfaction that oral control was slipping. "It won't work, I say. I'm too . . . smart for you."

"Yeah?"

"Yeah. You're not morons—none of you are. Fern's a good technician, maybe, but he isn't good enough. Remember, Van, you asked me in Quebec if there'd been any . . . change? I said there hadn't. I'm finding out now that I was wrong."

"How?"

"Lack of distraction." Quentin was talking too much; a symptom of intoxication. "A brain in a body can never concentrate fully. It's too conscious of the body itself. Which is an imperfect mechanism. Too specialized to be efficient. Respiratory, circulatory—all the systems intrude. Even the habit of breathing's a distraction. Now the ship's my body—at the moment—but it's a perfect mechanism. It functions with absolute efficiency. So my brain's correspondingly better."

"Superman."

"Super efficient. The better mind generally wins at chess, because it can forsee the possible gamblits. I can foresee everything you might do. And you're badly handicapped."

"Why?"

"You're human."

Egotism, Talman thought. Was this the Achillean heel? A taste of success had apparently done its psychological work, and the electronic equivalent of drunkenness had released inhibitions. Logical enough. After five years of routine work, no matter how novel that work might be, this suddenly altered situation—this change from active to passive, from machine to protagonist—might have been the catalyst. Ego. And cloudy thinking.

For Quentin wasn't a super-brain. Very definitely he was not. The higher an I. Q., the less need there is for self-justification, direct or indirect. And, oddly, Talman suddenly felt absolved of any lingering compunctions. The real Bart Quentin would never have been guilty of paranoid thought-patterns.

So—

Quentin's articulation was clear; there was no slurring. But he no longer spoke with soft palate, tongue and lips, by means of a column of air. Tonal control was noticeably altered now, however, and the Transplant's voice varied from a carrying whisper to almost a shout.

Talman grinned. He was feeling better, somehow.

"We're human," he said, "but we're still sober."

"Nuts. Look at the telltale. We're getting close to Earth."

"Come off it, Quent," Talman said wearily. "You're bluffing, and we both know you're bluffing. You can't stand an indefinite amount of high frequency. Save time and give up now."

"You give up," Quentin said. "I can see everything you do. The ship's a mass of traps anyway. From up here all I have to do is watch until you get close to one. I'm planning my game ahead, every gambit worked out to checkmate for one of you. You haven't got a chance. You haven't got a chance. You haven't got a chance."

From up here, Talman thought. Up where? He remembered little Cotton's remark that geometry could be used to locate the Transplant. Sure. Geometry and psychology. Halve the ship, quarter it, keep bisecting the remainders—

Not necessary. *Up* was the keyword. Talman seized upon it with an eagerness that didn't show on his face. *Up,* presumably, reduced by half the area they'd have to search. The lower parts of the ship could be ruled out. Now he'd have to halve the upper section, using the celestial globe, say as the dividing line.

The Transplant had eye cells spotted all over the ship, of course, but Talman tentatively decided that Quentin thought of himself as situated in one particular spot, not scattered over the whole ship, localized wherever an eye was built in. A man's head is his locus, to his own mind.

Thus Quentin could see the red spot on the celestial globe, but that didn't necessarily mean that he was located in a wall facing that hemisphere of the sphere. The Transplant had to be trapped into references to his actual physical relation to objects in the ship—which would be hard, because this could be done best by references to sight, the normal individual's most important link with his surroundings. And Quentin's sight was almost omnipotent. He could see everything.

There had to be a localization—somehow.

A word-association test would do

it. But that implied co-operation. Quentin wasn't that drunk!

Nothing could be gauged by learning what Quentin could *see*—for his brain was not necessarily near any one of his eyes. There would be a subtle, intrinsic realization of location on the Transplant's part: the knowledge that *he*—blind, deaf, dumb except through his distant extensor sensory mechanisms—was in a certain place. And how, except by too obviously direct questioning, could Quentin be made to give the right answers?

It was impossible, Talman thought, with a hopeless sense of frustrated anger. The anger grew stronger. It brought sweat to his face, rousing him to a dull, aching hatred of Quentin. All this was Quentin's fault, the fact that Talman was prisoned here in this hateful spacesuit and this enormous death trap of a ship. The fault of a machine—

Suddenly he saw the way.

It would, of course, depend on how drunk Quentin was. He glanced at Fern, questioned the man with his eyes, and in response Fern manipulated a dial and nodded.

"Damn you," Quentin said in a whisper.

"Nuts," Talman said. "You implied you haven't any instinct for self-preservation any more."

"I . . . didn't—"

"It's true, isn't it?"

"No," Quentin said loudly.

"You forget I'm a psychologist, Quent. I should have seen the angles before. The book was open, ready to read, even before I saw you. When I saw Linda."

"Shut up about Linda!"

Talman had a momentary, sick vision of the drunken, tortured brain somewhere hidden in the walls, a surrealistic nightmare. "Sure," he said. "You don't want to think about her yourself."

"Shut up."

"You don't want to think about yourself, either, do you?"

"What are you trying to do, Van? Get me mad?"

"No," Talman said, "I'm simply fed up, sick and disgusted with the whole business. Pretending that you're Bart Quentin, that you're still human, that we can deal with you on equal terms."

"There'll be no dealing—"

"That's not what I meant, and you know it. I've just realized what you are." He let the words hang in the dim air. He imagined he could hear Quentin's heavy breathing, though he knew it was merely an illusion.

"Please shut up, Van," Quentin said.

"Who's asking me to shut up?"

"I am."

"And what's that?"

The ship jumped. Talman almost lost his balance. The line hitched to the pillar saved him. He laughed.

"I'd be sorry for you, Quent, if you were—you. But you're not."

"I'm not falling for any trick."

"It may be a trick, but it's the truth too. And you've wondered about it yourself. I'm dead certain of that."

"Wondered about what?"

"You're not human any more," Talman said gently. "You're a thing. A machine. A gadget. A spongy gray hunk of meat in a box. Did you really think I could get used to you—now? That I could identify you with the old Quent? You haven't any face!"

The sound-box made noises. They sounded mechanical. Then—

"Shut up," Quentin said again, almost plaintively. "I know what you're trying to do."

"And you don't want to face it. Only you've got to face it, sooner or later, whether you kill us now or not. This . . . business . . . is an incident. But the thoughts in your brain will keep growing and growing. And you'll keep changing and changing. You've changed plenty already."

"You're crazy," Quentin said. "I'm no . . . monster."

"You hope, eh? Look at it logically. You haven't dared to do that, have you?" Talman held up his gloved hand and ticked off points on his sheathed fingers. "You're trying very desperately to keep your grip on something that's slipping away—humanity, the heritage you were born to. You hang on to the symbols, hoping they'll mean the reality. Why do you pretend to eat? Why do you insist on drinking brandy out of a glass? You know it might just as well be squirted into you out of an oil can."

"No. No! It's an aesthetic—"

"Garbage. You go to teleshows. You read. You pretend you're human enough to be a cartoonist. It's

a desperate, hopeless clinging to something that's already gone from you, all these pretenses. Why do you feel the need for binges? You're maladjusted, because you're pretending you're still human, and you're not, any more."

"I'm . . . well, something better—"

"Maybe . . . if you'd been born a machine. But you *were* human. You had a human body. You had eyes and hair and lips. Linda must remember that, Quent.

"You should have insisted on a divorce. Look—if you'd only been crippled by the explosion, she could have taken care of you. You'd have needed her. As it is, you're a self-sufficient, self-contained unit. She does a good job of pretending. I'll admit that. She tries not to think of you as a hopped-up helicopter. A gadget. A blob of wet cellular tissue. It must be tough on her. She remembers you as you used to be."

"She loves me."

"She pities you," Talman said relentlessly.

In the humming stillness the red telltale crept across the globe. Fern's tongue stole out and circled his lips. Lindquist stood quietly watching, his eyes narrowed.

"Yeah," Talman said, "face it. And look at the future. There are compensations. You'll get quite a bang out of meshing your gears. Eventually you'll even stop remembering you ever were human. You'll be happier then. For you can't hang on to it, Quent. It's going away. You can keep on pretending for a while, but in the end it won't matter any more. You'll be satisfied to be a gadget. You'll see beauty in a machine and not in Linda. Maybe that's happened already. Maybe Linda knows it's happened. You don't have to be honest with yourself yet, you know. You're immortal. But I wouldn't take that kind of immortality as a gift."

"Van—"

"I'm still Van. But you're a machine. Go ahead and kill us, if you want, and if you can do it. Then go back to Earth and, when you see Linda again, look at her face. Look at it when she doesn't know you're watching. You can do that easily. Rig up a photoelectric cell in a lamp or something."

"Van . . . *Van!*"

Talman let his hands drop to his sides. "All right. Where are you?"

The silence grew, while an inaudible question hummed through the yelllow vastness. The question, perhaps, in the mind of every Transplant. The question of—a price.

What price?

Utter loneliness, the sick knowledge that the old ties were snapping one by one, and that in place of living, warm humanity there would remain—a mental monster?

Yes, he had wondered—this Transplant who had been Bart Quentin. He had wondered, while the proud, tremendous machines that were his body stood ready to spring into vibrant life.

Am I changing? Am I still Bart Quentin?

Or do they—the humans—look

on me as— How does Linda really feel about me now? Am I— Am I— It?

"Go up on the balcony," Quentin said. His voice was curiously faded and dead.

Talman made a quick gesture. Fern and Lindquist sprang to life. They climbed, each to a ladder, on opposite sides of the room, but carefully, hitching their lines to each rung.

"Where is it?" Talman asked gently.

"The south wall— Use the celestial sphere for orientation. You can reach me—" The voice failed.

"Yes?"

Silence. Fern called down, "Has he passed out?"

"Quent!"

"Yes— About the center of the balcony. I'll tell you when you reach it."

"Easy," Fern warned Lindquist. He took a turn of his line about the balcony rail and edged forward, searching the wall with his eyes.

Talman used one arm to scrub his fogged face plate. Sweat was trickling down his face and flanks. The crawling yellow light, the humming stillness from machines that should be roaring thunderously, stung his nerves to unendurable tension.

"Here?" Fern called.

"Where is it, Quent?" Talman asked. "Where are you?"

"Van," Quentin said, a horrible, urgent agony in hi stone. "You can't mean what you've been saying. You can't. This is . . . I've

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THE SHADOW

AT ALL NEWSSTANDS

got to know! I'm thinking of Linda!"

Talman shivered. He moistened his lips.

"You're a machine, Quent," he said steadily. "You're a gadget. You know I'd never have tried to kill you if you were still Bart Quentin."

And then, with shocking abruptness, Quentin laughed.

"Here it comes, Fern!" he shouted, and the echoes crashed and roared through the vaulted chamber. Fern clawed for the balcony rail.

That was a fatal mistake. The line hitching him to that rail proved a trap—because he didn't see the danger in time to unhook himself.

The ship jumped.

It was beautifully gauged. Fern was jerked toward the wall and halted by the line. Simultaneously the great celestial globe swung from its support, in a pendulum arc like the drive of a Gargantuan fly swatter. The impact snapped Fern's line instantly.

Vibration boomed through the walls.

Talman hung on to a pillar and kept his eyes on the globe. It swung back and forth in a diminishing arc as inertia overcame momentum. Liquid spattered and dripped from it.

He saw Lindquist's helmet appear over the rail. The man yelled, "Fern!"

There was no answer.

"Fern! Talman!"

"I'm here," Talman said.

"Where's—" Lindquist turned his head to stare at the wall. He screamed.

Obscene gibberish tumbled from his mouth. He yanked the blaster from his belt and aimed it at the maze of apparatus below.

"Lindquist!" Talman shouted. "Hold it!"

Lindquist didn't hear.

"I'll smash the ship," he screamed. "I'll—"

Talman drew his own blaster, steadied the muzzle against the pillar, and shot Lindquist in the head. He watched the body lean over the rail, topple, and crash down on the floor plates. Then he rolled over on his face and lay there, making sick, miserable sounds.

"Van," Quentin said.

Talman didn't answer.

"Van!"

"Yeah."

"Turn off the inductor."

Talman got up, walked unsteadily to the device, and ripped wires loose. He didn't bother to search for an easier method.

After a long while the ship grounded. The humming vibration of currents died. The dim, huge control chamber seemed oddly empty now.

"I've opened a port," Quentin said. "Denver's about fifty miles north. There's a highway four miles or so in the same direction."

Talman stood up, staring around. His face looked ravaged.

"You tricked us," he mumbled. "All along, you were playing us like fish. My psychology—"

"No," Quentin said. "You almost succeeded."

"What—"

"You don't think of me as a gadget, really. You pretended to, but a little matter of semantics saved me. When I realized what you'd said, I came to my senses."

"What I said?"

"Yeah. That you'd never have tried to kill me if I'd still been Bart Quentin."

Talman was struggling slowly out of his spacesuit. Fresh, clean air had already replaced the poison atmosphere of the ship. He shook his head dazedly.

"I don't see it."

Quentin's laughter rang out, filling the chamber with its warm, human vibrancy.

"A machine can be stopped or destroyed, Van," he said. "But it can't be—*killed*."

Talman didn't say anything. He was free of the bulky suit now, and he turned hesitantly toward a doorway. He looked back.

"The door's open," Quentin said.

"You're letting me go?"

"I told you in Quebec that you'd forget our friendship before I did. Better step it up, Van, while there's still time. Denver's probably sent out helicopters already."

Talman swept one questioning look around the vast chamber. Somewhere, perfectly camouflaged among those mighty machines, was a small metal cylinder, cradled and shielded in its hidden socket. Bart Quentin—

His throat felt dry. He swallowed, opened his mouth, and closed it again.

He turned on his heel and went out. The muffled sound of his footsteps faded.

Alone in the silent ship, Bart Quentin waited for the technicians who would refit his body for the Callisto flight.

THE END.

IN TIMES TO COME

We will, of course, have the concluding part of World of $\overline{A}$ next month. I promise you you'll find it of even greater scope than you at present expect. The full implication of the ending of the yarn, by the way, takes about twenty-four hours to percolate, I found. A fact which you're apt to find disconcerting, when the thing does finally stack up. But you'll find out—

You'll also find out that A Bertram (Jack) Chandler has a yarn with a basically new thesis—and a highly interesting one. To the best of my knowledge, it's the first time the particular proposition has ever been presented—and in the "Giant Killer" it is presented with vim, vigor and verve—also a brutal viciousness. The proposition? Well, it's Chandler's to present—but I'd like to point out that in all human history very little mention has been made of another animal that has had tremendous influence on the course of that history. It seems rather improbable that we'll succeed in keeping it out of future history.

THE EDITOR.

(*Continued from page 46*)

further questions. I shall say no more."

Gosseyn climbed to his feet with a grim smile. "I'm afraid this is a vicious circle," he said. "I shall certainly not kill myself until I know all the facts. And besides—"

He stopped. The realization came that he was actually talking about it, discussing it, as if it was something that could be argued. Whereas the reality was different altogether. It wasn't a matter of not killing himself because of this or that or the other. Or because somebody wasn't being verbose enough.

He wasn't killing himself. PERIOD.

Without another word, he turned and strode out of the cubbyhole, out of and away from the Machine.

All through that day, he was a man torn by an admixture of amazement and despair. Once, he paused in the center of a crowded street, and said aloud, savagely:

"What a fix to be in."

The staring people, the surge of other sound, brought him out of that. He hurried on, and it was an aimless hour later that he suddenly remembered a fact about unsanity:

This walking! The endless urge to walk by oneself was a recognized sign of approaching neuroticism, though actually if the patient understood the reason for that in its fullest meanings, it was wise to let the desire run its course. The important thing was to end the walk in a purposeful fashion. And then carry through that purpose.

By evening, the high fever of restlessness was beginning to recede. He felt tired and unhappy, but also much more thoughtful. What was it Crang had said:

"If we don't kill you, no one else will except you or some other agent of the invisible chess player!"

Crang hadn't meant the Machine, because he must have known that it couldn't kill. But then who?

The chill of excitement that came had all the tingling qualities of an icicle. The question was, how could he make sure that the agent would be able to find him?

It took a little while to think of a possible answer. And it required a whole hour of hurrying through shadows that thickened the spaces around buildings, for him to get there.

He came at last to the vacant lot, where Patricia and he had spent the first of the policeless nights. In a few days now, that curious period in which a great city was unguarded, would end. In view of what had happened on Venus, Gosseyn was no longer sure that the attempt to imitate for one month each year the policeless state of that planet, was a wise one. Whoever had first conceived the idea had evidently been experimenting. The experiment needed to be reviewed in the light of recent events.

Nevertheless, it was still in force.

Gosseyn was in no hurry to invade the dark square that was the lot. There were a number of stores open a block away; and Gosseyn went into one and bought several spools of thread. When he had completed his purchase, he hesitated, and then said:

"I suppose you have a lie detector here for those customers who want credit?"

The man looked at him curiously. "That's right."

"I'll give you," said Gosseyn, "forty dollars for it. I want it for three days, but I'll bring it back here every morning, and leave it with you until evening. At the end of the three days, I'll sell it back to you for twenty dollars."

Since the instruments only cost thirty-five dollars new, he was not surprised when the dealer turned on his heel, disappeared into a back room, and emerged a minute later with a detector that must have been at least fifteen years old.

Gosseyn grinned at the dilapidated thing, and then paid over the money. "O.K.," he said. "So long as it works."

He spent half an hour cautiously exploring the lot. But no one had beaten him there. It took another ten minutes to loop the thread in a wide circle around where he intended to wait, and tie the ends to his fingers.

For a while, then, Gosseyn lay on his back staring up through the lacework of leaves into the vagrant mists that still remained from the previous night. There were fuzzy images of stars visible through that ghost of a fog: he could see Venus in the southeast, the brightest star of the evening.

For the thousandth time, he tried to picture the invasion: the planet of colossal trees and perpetually marvelous climate ablaze from pole to pole. Men dropping down from the skies in such numbers that all the hazy blue heavens over cities he himself had never seen would have been darkened by their falling shapes.

Maybe he ought to try to go to Venus.

He pondered the prospect. With so many ships flying there, surely he could get on one secretly. And he might be of some help, if only because he would be able to tell the Venusians what he knew.

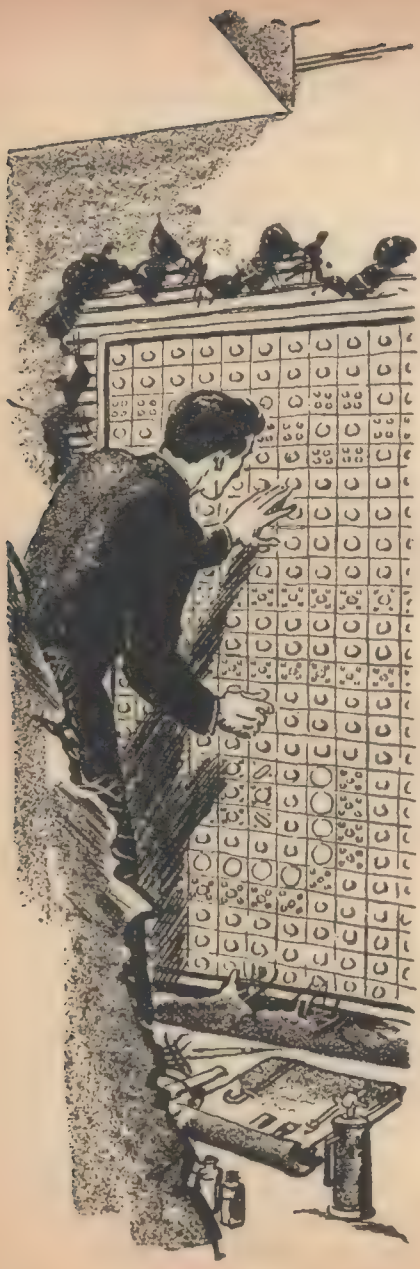
They must be in a bad way, having no knowledge of the enemy's purposes aside from the bloody reality of the conquest. Resistance would be easier if they had a few facts on which to base it.

Funny how he took it for granted that there would be resistance, even though the Venusians would have no weapons to begin with.

The trip to Venus would have to wait of course, while he kept this rendezvous with a cosmic chess player's agent. Accordingly, he would have at least two whole days in which to explore fully all the trails on Earth that it might occur to him to follow up.

For one thing, he ought to try to have a talk with Patricia Hardie. Suppose he phoned her in the morning, and invited her for lunch.

She *might* be able to explain why



the belief had once been planted in his mind that he had been married to her, and that she had died leaving him a widower.

It was a curious, useless sort of a false notion for anybody to have planted deliberately in his mind and—

There was a sharp tug on his finger. The thread broke. Gosseyn saw the shadow twenty feet to his right.

He flung himself sideways to his feet, as Patricia Hardie's voice hissed at him out of the darkness:

"I thought I'd find you here, you murderer!"

There was the flash of a flame gun; and then—

Gosseyn had the gun, had the girl.

His mind began to emerge from its hard concentration. He had been intent, like a boxer who has forgotten that his opponent is anything more than a pair of weaving fists in front of a dodging body. Now, abruptly, her identity penetrated.

The flaring thought that came reached out, and consumed a dozen patterns of the situation. He said in a low, intense voice:

"Did you tell anybody you were coming?" He shook her with unconscious brutality. *"Who did you tell?"*

"No one!" Her voice was sullen.

"I hope that's the truth, for your sake. Here—wait a minute. Grab these ends of lie detector." He dragged her as he would a child over to the instrument. "Will you

swear that you told no one? Will you swear it?"

The sheer, burning power of his manner must have impressed her. "Yes, yes, I'll swear. What's the matter?"

Gosseyn sighed after the detector had confirmed her words. "And now," he said, "we can get down to brass tacks. Who sent you to kill me? And don't give me any nonsense about doing it because you think I killed your father! Come on now, spill it."

"My father," she said. "It was my father."

Gosseyn stared at the shadow that was her face. "But he's dead."

"He said . . . he said: 'Pat, if *they* don't kill Gosseyn tonight, either you or I will have to. It's orders.' He said that about three hours before you arrived with Crang from Venus."

"But—" said Gosseyn.

He felt as if he was swinging loosely at the end of a limb. Her voice came again out of the darkness, heavy with bitterness:

"You think you're alone in not knowing what this is all about. Listen to me. About twelve years ago, there I was, just like you. I had no past either; and, worse still, no extra-brain.

"I asked my father," she went on, "and he said: 'You're to act the part of my daughter.'"

Gosseyn's brain gave the impression of jumping violently. "And what," he asked, "was *his* role?"

"He was to build up an organization against the Machine and against Ā. The Machine, he told me, had instructions to help him."

"But that's crazy," said Gosseyn. "Why should the Machine help him to organize a gang against itself?"

He realized he was asking stupid questions. They were all pawns in some tremendous game. But who was fighting who? And for what?

He came out of his shock. "Somebody," he said aloud, "who can create the same personality in two bodies, give one individual—me—an extra-brain, give others—you and your father—brains similar in structure to the human brain, organize a gang for the purpose of having it taken over by the enemy, whose purpose is to destroy Ā. And actually let the attack take place."

Gosseyn shook his head wonderingly; and then intensely conscious again of the night, snatched at her arm.

"Swear that! Will you swear that all that you've told me is the truth?"

She would. She did. And it was so.

"You poor idiot!" said Gosseyn at last. "Get back to the palace as fast as you can. And don't tell anybody you tried to kill me. Do you understand? *Anybody!*"

"You mean you're going to let me go?" She sounded plaintive.

"Tomorrow," said Gosseyn, "tomorrow at one, I'm coming to see you. Make the usual arrangements to have me admitted. But see that I'm allowed in. Understand?"

"Yes." She sounded faint. "You're hurting my arm."

Gosseyn released her. "I'm

sorry," he apologized. "I'm just a little bit keyed up. But now, before you go, I'm going to tell this lie detector that I didn't kill your father. That's in case you really believe those words you spoke as you fired. Personally, I think they were designed to fool me, in case you missed."

The girl said nothing. A minute later, he watched her slip off into the deeper darkness; and after a while, far away, a car started up softly.

Gosseyn strung a new line of threads, and then lay down again. The tension was going out of his body now; and realization came that he had acted more or less instinctively, and without thought.

He spent the night without further outside interruption, alternatively sleeping and planning. By morning what had been the vaguest of ideas had become clear except for certain details of the kind that no one could ever settle in advance. The moment, the chance falling of events alone, could determine their nature.

The important thing was that, as he entered the palace, he do NOT bump into Crang or Thorson or Prescott. At very least, those three men must be avoided.

It was Prescott that he ran into.

XIV.

"As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality."

A. E.

Gosseyn had walked up to the main entrance a few minutes before one o'clock. He was not alone. Men and women moved in and out of the great doors; and their presence threw a sort of a fog around him, hiding him from close observation.

There was, of course, the necessity of passing the guard office inside the entrance. Gosseyn peered into the glass wicket at the chunky individual who sat there.

"My name is Gosseyn. I have an appointment with Miss Patricia Hardie for one o'clock."

The man ran his finger down a list of names. Then he pressed a button. A long young man in uniform popped out of a door near the wicket. He took Gosseyn's brief case and led the way to an elevator, the doors of which were just opening. One of the three people who came out of it was Prescott.

He stared at Gosseyn in surprise. His face darkened.

"What brings you back here?" he said.

Gosseyn braced himself. There was nothing to do but make the best of the fantastically bad luck. He had a vague plan for such a meeting as this, but his heart sank like a lead weight, as he said the words he had prepared:

"I have an appointment with Crang."

"Eh! Why, I just left Crang. He didn't mention that he was seeing you."

It struck Gosseyn that he didn't like this man, didn't like him intensely.

"He's giving me three minutes," he said. "But maybe you've got some ideas on what I have to say."

Prescott looked, as if he absolutely didn't believe a word of it. He just stood there, cold, watchful, suspicious, as Gosseyn described his visit to the Machine, and of how the Machine wanted him to kill himself, so that a third Gosseyn might appear. He omitted what the Machine had told him of the attack on Venus, and finished darkly:

"I've got to see that third body. I'm just enough of a null-A not to believe in the triplicate even after I've seen the duplicate. Imagine anybody expecting a person of my sanity training to blow out his brains."

He hadn't expected to rouse himself emotionally again over the idea, but the reality behind the words struck him anew. He shuddered involuntarily.

"I'm looking for clues," he said. "I even thought of coming to talk with Thorson. Somehow"—he looked hard at the other—"after last night, I didn't think of you."

Prescott's countenance showed no hint of his reaction to last night. He said bleakly:

"We've looked everywhere for other bodies of yours. Naturally," he went on, "we know what we told Gosseyn I about his origin wasn't true. That was for the benefit of Hardie and La—" he corrected himself, "and for 'X'"

It wasn't the almost naming of "X" that interested Gosseyn. It was that they had searched, too. He was chilled by the deadly implications.

"Where did you look?" he said tautly.

Prescott laughed. "We've been reduced to some pretty wild ideas," he confessed. "At first we thought you, and others like you, must be concealed in an aspect of reality that we had missed because of our neural limitations.

He showed his teeth in a wolfish smile. "I won't explain that," he said. He went on: "Then we began to make soundings from the air for caves on both Earth and Venus. That got us nowhere, although we discovered a surprising number of hitherto unsuspected caves in every aspect of reality.

"The problem," Prescott continued, frowning, "is greatly complicated by a law of nature, of which you have probably never heard. The law is this: If two energies can be attuned on a twenty decimal approximation of similarity, the greater will bridge the gap of space between them, just as if there was no gap, although the juncture is accomplished at finite speeds."

"That," said Gosseyn, "sounds like pure Greek."

Prescott laughed, louder this time. "Think of it this way then," he said. "How do you explain the fact that you have in your mind the details of what Gosseyn I did and thought? You must have been attuned, you and he; in fact, it is the only theoretically sure method of thought transmission—you have to do it with yourself. Anyway, it

didn't matter where you were, his thoughts, *being alive,* would have been the stronger, and would have flashed to you wherever you were within the limits of reachable space. I won't define those limits."

He broke off: "We've even examined meteorites as far away as the rings of Saturn in the apparently mistaken belief that some of them might have been hollowed out, and fitted up as incubators with Gilbert Gosseyns in various stages of growth. That will show you how seriously we—"

There was an interruption from a man in military uniform.

"Our car is waiting, Mr. Prescott. The ship leaves on the half hour."

"Be right with you, general."

Without further ado, he started to follow the officer. Then he paused, turned and came back. He said:

"In a way we're curious to see this Gosseyn III. I advise you, however," he went on, "not to make the mistake of leading us to him before you die of old age. Since you will already have had cautious thoughts in that connection, I am not giving anything away when I say that we shall kill him, and that then there will be no reason for not killing you. I suggest, furthermore, that there *must* be an end somewhere to the total number of Gilbert Gosseyns."

He twisted away and, without looking back, walked to the door. There was a car waiting at the foot of the steps. Gosseyn saw him climb into it.

In a few moments, Prescott would be thinking over the meeting. And somewhere along the line, he would pick up the carphone, and call Crang.

Gosseyn could hardly stand still in the elevator. His plan to get hold of the Distorter intact was shattered by the accidental meeting but—

He wasted no time, after the girl had let him in. Even as she was mumbling something about how dangerous it was for him to come to the palace, he was tugging a cord out of the bottom of his brief case.

She was amazed when he started to tie her. She had a little automatic up the voluminous sleeve of her dress, that she tried to get at. Gosseyn took it, and shoved it in his pocket; and when he had carried her, bound and gagged, into the bedroom, and laid her on the bed, he said:

"I'm sorry. But this is for your own good, in case somebody interrupts us."

He wasn't sorry. He was only in a hurry.

At top speed, he ran back into the living room for his brief case. The tools in it he tumbled onto the bed beside the girl, snatched an atomic cutter—and ran for the wall he had decided the previous night was the only one the Distorter could possibly be in.

The Distorter *must* be facing the Games Machine a third of a mile away. And whatever its form it couldn't be too tiny. At six hun-

dred yards, even a searchlight had to have power and size behind it to shine brightly. Assuming that its attunement with the Machine's functions was not of the twenty decimal refinement mentioned by Prescott, then power alone would be able to inhibit those functions—from a distance.

There was an alcove for the French doors which led out onto the balcony. One of the alcove walls came more than a foot further into the room than the other.

Gosseyn adjusted the atomic cutter to penetrate the plaster and the plaster wire which was underneath the plaster. It took five long minutes to shear an eight-foot square, and another two minutes to cut the odd ends of wire that persisted in holding.

With a jerk he pulled the wall down. Trailing a fine shower of dust, he carried it and set it against the other alcove wall.

When he came back, there was the Distorter. It was about six feet high by four wide by one and a half thick. It was smaller than Gosseyn had expected; and it had no visible wires running from it.

Gosseyn caught it width-wise between his hands, and gave a tentative tug. It came up in his grasp like an empty box. About fifty pounds, he estimated, as he carried it over near the bed, and laid it, face pointing upwards, on the rug.

He stared down at a mass of tiny protruding glasslike tubes. Obviously an electronic device of some kind, one of the quantity of developments on an intricate variational theme, that had begun several hundred years before.

It was, in short, a rather common, garden-variety device; and Gosseyn was relieved. There had been a picture in his mind, a curious, unhealthy picture of alienness, product of an intelligent nervous system that was more different from man than the difference between Earth-born human and Earth-born ant. He had even found himself wondering shakily what abstractions a totally different mind would make out of the phenomenon of electric current.

Apparently nothing. The possibility of unearthly creatures being involved in all this was fading, fading.

With a start, he remembered his purpose. Galvanized, he snatched the atomic cutter from the bed and, whirling towards the Distorter, prepared to cut it to bits. As he bent over it, he paused, frowning, and looked at his watch.

It was twenty-five minutes to two.

The fever of urgency sagged in him. He went over and peered out of the French windows. The great sweep of lawn that led towards the Machine, spaced here and there with shrubs, was almost deserted. At uneven intervals, gardeners were stooping over flowers, performing the obscure tasks of their profession.

Beyond was the Machine, an enormous glittering mass surmounted by its quadrillion candlepower beacon.

So near, the Machine; yet so far. And yet—

Maybe his original plan would still work; maybe he really had fooled Prescott with that story about being here to see Crang. And right now, the man would be on the ship that was to leave at 1:30.

Ship! What ship?

A great light dawned on Gosseyn. He hadn't thought of it before, hadn't thought of anything except his purpose. But now, abruptly, the picture seemed clear:

Spaceship! Prescott was going to Venus. Thinking that was true didn't make it so, of course. But human decisions were based as much on probabilities as on apparent facts.

With abrupt decision, Gosseyn picked up Patricia Hardie's bedside phone, and, when a girl's voice answered, said:

"Give me the chief carpenter, please."

"I'll connect you with the Palace Works Superintendant," the silvery voice trilled.

A moment later, a gruff voice muttered at Gosseyn, who explained what he wanted, and hung up. He was quivering with excitement.

"It's got to work," he thought tautly. "Things like this always work when put through with boldness."

He hurriedly carried the Distorter into the living room. Then he closed the bedroom door. A short time after that, there was a pounding at the door.

It was no time for hesitation. Gosseyn unlocked the door. Five men trooped in, three of them carrying lumber. Without pause, these three fell to work and crated the Distorter.

They had silent cutting machines, automatic screw-driving devices—in seven minutes by Gosseyn's watch, they were finished. The two truckmen who had so far done nothing, picked up the crate; one of them said:

"We'll have this delivered in five minutes, mister."

Gosseyn could only trust himself to nod. He closed and locked the door behind them, and then went into the bedroom.

He didn't glance at the girl, but hurried over to the French windows. In two minutes a truck with a narrow crate on it, wheeled into view on the paved road a quarter of a mile away. It drove straight up to the Machine, and disappeared into an overlapping fold of metal.

Two minutes later, it reappeared —empty.

Without a word, Gosseyn walked over, and ungagged, unbound the girl.

He was conscious of a vague dissatisfaction, an inexplicable sense of frustration.

XV.

Who then is sane?
(*Quisnam igitur sanus?*)
Horace: Satires, II
circa 25 B.C.

Patricia Hardie sat on the bed, rubbing the circulation back into her arms. She didn't speak, simply sat there massaging. And looked

at him, a faint smile curling her lips.

After a moment, the smile puzzled Gosseyn. He glanced at her sharply—and saw that the smile was cynical, knowing.

"So you didn't succeed!" she said.

Gosseyn stared at her. She went on:

"You were hoping you'd be killed when you came to the palace today, weren't you?"

Gosseyn parted his lips to say: "Don't be silly!" But he didn't say it.

He was visualizing his tight-stomached approach to the palace, his successful accomplishment of his purpose. And then, his disappointment. Dissatisfaction.

Surely, surely, men could fool themselves.

The girl's voice came again, satiric, stinging now:

"That's the only reason you came to get the Distorter. You know you've got to die, and let Gosseyn III appear. And so you were hoping the attempt would land you in deadly danger."

He could see it now clearly. No sane man could commit suicide, or let others kill him without resisting. And so his subconscious had tried to find a way out.

How clear, how clear. The idea of stealing the Distorter—to help free the Machine, he had told himself, so that it could broadcast warnings. But actually that had only been a way of plunging himself into a situation, where death might come. The death he had to have.

"Do I believe," he wondered, "in Gosseyn III? I do."

It was stunning. Because he had told himself again and again that it was absolutely impossible.

"Can I kill myself? Not yet! But there is a way.

"There is a way."

He whirled on the girl, suddenly furious with her for having taunted him. But she must have watched the changing pattern of passions on

his face. Before he could speak, she said softly:

"If even you can fool yourself so badly, that gives me hope."

Gosseyn thought of the depths of neuroticism from which she spoke, and his anger transformed into a great pity. Because it was true. There *was* hope—but no one was ever safe. Twinges of unsanity stole unsuspected out of emotional turmoils, surprises, danger, fear, the reality of life itself.

The trained strong and the trained brave maintained a precarious balance on the edge of the darkness. The rest, down, down, in the shadows they fumbled their lives away, seeking paths they were too blind to follow.

Gosseyn turned from the girl wordlessly, and started for the door.

"Where are you going?" she called after him.

He had forgotten her. Her voice recalled him briefly to her problem. He turned. He said quietly:

"Get some plasterers up here, to put that wall back in place. And you, personally, leave here right away. Never mind clothes, or anything. Just take it for granted they'll be suspicious of you. Wire your secretary you've gone for a rest, but don't say where. Goodbye and good luck!"

He went out of the door, and down out into the boulevard. Downtown, he stopped in a drugstore, and asked for a bottle of Coue Hypnotic Drug.

"Starting early to train for next year's games, eh?" said the druggist.

"Something like that," Gosseyn answered shortly.

He went next to a voice-recording firm. "I'd like to rent one of your machines for a week for repeat recording."

"Do you want the attachment to make your own recordings?"

"Yes."

"That will be one dollar fifty, please."

At the hotel where he had his things, Gosseyn secured the key to his locker, took the rest of his money; then he returned to the desk.

"On the first day of the games," he said, "I was kicked out of this hotel because of a mix-up over my identity. Will you rent me a room now for a week?"

The clerk did not even hesitate. The hotel must have been practically empty, after the great exodus from the city of people who had failed to win at the games. In two minutes, a bellhop was leading Gosseyn to an elevator, and up to a spacious room.

Gosseyn locked the door, made the recording he had in mind, and put it on the player to repeat endlessly. Then he swallowed the drug, and lay down on the bed.

"In twenty-four hours," he thought, "the effect will wear off; and then—"

He put the glittering little automatic he had taken from Patricia Hardie on the table beside the bed.

It was not sleep that came then. It was a torpor, a heavy tiredness,

through which impressions filtered, particularly noises. One noise, one steady, whining sound: the sound of his voice on the recording he had made:

"I'm nobody . . . I'm not worth anything . . . Everybody hates me . . . What's the good of being alive . . . I'll never make anything of myself . . . No girl will ever marry *me* . . . I'm ruined . . . no hope . . . no money . . . Kill myself . . .

"Everybody hates me . . . hates me . . . hates me—"

There were millions of unintegrated people who thought and thought things like that, without ever reaching the point of suicide. It was a matter of sustained intensity, and of the awful unbalance that came to men who had tumbled from a height of integration into the depth of despair.

"What's the good of being alive? . . . What's the good . . no hope . . . kill myself!"

During the first hour, he had many intruding thoughts of his own. "This is silly! My brain is too stable for it ever to be affected by—No hope . . . Everybody hates me . . . I'm not worthy—"

It was towards the end of the second hour when a thunderous roar began far away. It kept on and on, frequently rising to such crescendo that the whining voice beside the bed was drowned out. At last, the violent persistence of it wrung a dull, surprised recognition from Gosseyn:

"Guns! Artillery fire! Have they started to attack Earth?"

He was conscious of horror. After a long time, without having any memory of deciding to get up, he *was* up. How tired he was— "I'm not worthy . . . ruined . . . no hope . . . kill myself—"

He was aware of himself crawling across the floor to the window. He peered out—at another building. But the thunder of the guns was louder here, and more furious sounding.

He had his first realization of the direction from which it was coming: The Machine!

For a moment of terrible fear, that lifted the pressing veil of daze from his mind: The Machine! the Machine was being attacked!

"I'm nobody . . . Kill myself . . . Everybody hates me . . . What's the good of being alive?"

The Machine, finding itself free of the control of the Distorter, must have started broadcasting warnings about the attack on Venus! And the gang was trying to destroy it.

Broadcasting? The hotel room radio! Crawl towards it. How tired he was— "Kill myself . . No hope!"

He must have succeeded in switching on the radio because:

"Blasted . . . murderous . . . incredible . . . criminal—"

Even in spite of his torpor, Gosseyn jumped. And then frowned in dim understanding: The propaganda war also was on.

Everywhere he laboriously turned the dial, voices were roaring their threats and accusations: The Machine! the dastardly Machine! Mechanical monstrosity, treacherous, inhuman; and the Venusian

plotters who had foisted its poisonous alien will upon men. Strait jacket . . . assassin . . . massacre—

And all the time, as a background to the lying voices, came the thunder of the guns, the muffled, unceasing thunder of the guns.

Gosseyn began to doze. Better get to bed. Tired. So tired.

"GOSSEYN!"

All the other voices blotted out. Radio talking direct to him. Funny.

"GOSSEYN, THIS IS THE MACHINE TALKING. DON'T KILL YOURSELF."

"Kill myself! I'm nobody. Everybody hates me. What's the good of being alive."

"GOSSEYN, DON'T KILL YOURSELF. YOUR THIRD BODY HAS BEEN ACCIDENTALLY DESTROYED.

"GOSSEYN, I'M SORRY TO HAVE TO TELL YOU PUBLICLY LIKE THIS, BUT THERE'S NO OTHER WAY, NO TIME . . . GOSSEYN, I CAN'T LAST MUCH LONGER. DURING THE FIRST HALF HOUR, NORMAL SHELLS WERE FIRED AT ME. BUT AT INTERVALS NOW, SOMETHING ABSOLUTELY DEVASTATING HAS STRUCK AT MY DEFENSES.

"I HAVE A NINETY-FOOT STEEL OUTER BARRIER. GOSSEYN, IT'S BEEN PENETRATED FIVE TIMES BY SHOTS THAT CAME FROM THE DIRECTION OF VENUS.

"GOSSEYN, DON'T KILL YOURSELF. YOUR THIRD BODY HAS BEEN ACCIDENTALLY DESTROYED. YOU MUST LEARN TO USE YOUR EXTRA-BRAIN. I CAN GIVE YOU NO ADVICE ABOUT THAT, NO INKLING OF ITS NATURE BECAUSE . . . *C-R-A-S-H-!*"

There was a pause; then: "Ladies and gentlemen, the Games Machine has just been destroyed by a direct hit. Its malicious, treacherous attack on the palace has been—"

Click!

He had been intending to turn it off for some minutes. Nuisance . . . Telling him something about —something—what?

Back on the bed, he lay puzzling about that. Something about—about—How tired he was. "Kill myself. Everybody hates me. I'm ruined. What's the good of being alive. Kill myself—"

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